

THE BRICKBUILDER

VOL. III.

BOSTON, DECEMBER, 1894.

No. 12.

BRICK AND MARBLE IN THE MIDDLE AGES.

THE CITY OF PADUA.

CHAPTER VII. — CONTINUED. G. EDMUND STREET.

PADUA, when I first saw it, seemed to me to be a most melancholy city; grass grew in the streets, the footways were all formed under dark and dismal arcades, and not only the external of the half-occupied palaces, but those even of all the houses, looked squalid, dirty, and miserable; nor was there any relief when one got into the more open spaces, for the large piazza on either side of the Palazzo della Ragione, or town hall, looked as squalid and uncared for, as dirty and unprepossessing, as they well could; nor was this universal squalor rendered at all less remarkable by the fact that Padua rejoices in a *café* which is said to surpass any other even in Italy, for its smartness; and the array of well-dressed gentlemen who frequented it certainly made the neighborhood look more wretched by contrast than it otherwise would.

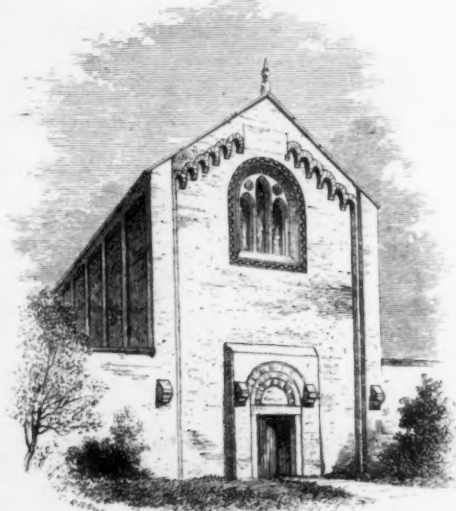
The Caffè Pedrocchi was, however, soon passed, and our first object was the Palazzo della Ragione,¹ whose vast and singular hall, about two hundred and fifty feet long by ninety feet wide, is one of the greatest architectural curiosities in the city. Its exterior has been modernized, so that now it is only remarkable for its long expanse of roof, but the interior is still in its original state. The access to the hall, which in this and other respects much resembles that at Vicenza, is from external arcades on the first floor, to which four staircases lead from below. The walls are low, and covered with paintings arranged in arcaded panels; some of these are said to be by Giotto, and the whole of them, I believe, were at any rate painted in his time, but have probably been repaired and retouched extensively long since. The windows are small, low down in the walls, and admit scarcely more than sufficient light for the lower part of the hall. The roof shows in section a vast pointed arch of timber, boarded and divided into panels by a succession of heavy vertical ribs scarcely at all moulded. The construction is obviously so weak as, from the very first, to have made the iron ties which hold it all together absolutely necessary. A curious feature in the design is, that instead of having gable walls the roof is hipped, and shows therefore at the end just the same section as at the sides. What little light finds its way into the dark obscurity of the roof is admitted through some small dormers high up in its framework. The effect of the hall is gloomy, and, compared to our own great halls, certainly shows some lack of knowledge

of construction on the part of its architect, and its bald heaviness makes it absurd to compare it to our own noble Westminster hall, though their very similar dimensions might naturally tempt us to do so. It dates from about the beginning of the fourteenth century, and the story runs that it was designed by a certain Frate Giovanni, who, travelling in India, saw the roof of a great palace the construction of which so pleased him that he brought back drawings of it with him, and erected its fellow here in Padua. How much truth there is in this tradition I cannot say, but this much seems clear, that in some way Padua has, if not a very beautiful, at any rate a very remarkable Sala, and one which is quite unlike any other room in Europe, with the single exception of the corresponding room at Vicenza, which was no doubt copied from it.

It has been burnt and damaged in one way and another repeatedly since it was first built, and in the course of the restorations the paintings on the walls have been excessively damaged, in many parts repainted, and in some obliterated altogether. The work was commenced, at any rate, if not completed, just at the time that Dante and Giotto were together in this part of Italy. The walls are all divided into four panels in height by borders, with painted pilasters for vertical divisions, and the panels are generally arched and cusped. The paintings include the apostles, the signs of the zodiac, representations of the months, the planets, and the constellations. The whole scheme is far too complex to be intelligible without a key. This fortunately is accessible in the very careful and complete account of all the subjects of the paintings on the walls which was prepared in 1858 by Mr. W.

Burges, and printed in the "Annales Archéologiques." With infinite pains he made out the meaning of the whole of the figures, — no light task, as, the walls being divided by painted borders and arcades into several stages in height, and an almost interminable number in length, spaces are provided for some four hundred subjects.²

At one end of the hall was the chapel of San Prodescimo, formed, I presume, by screens. The judges sat round the hall, forming so many courts in one room. At the opposite end was a cage, or prison, so that here, under one roof, with walls covered with illustrations,



THE ANNA CHAPEL, PADUA.

¹ A half-page photograph of this was published last month. — Ed.

² See also "Pietro Brandolese, Scultura, Pittura, etc., di Padova," Padova, 1795.

sat all the courts of Padua, without any of those ingenious divisions and subdivisions which are now necessary for the administration of the very smallest sort of justice, and, it may be hoped, with as much honesty as there certainly was simplicity.

Nowadays the hall is quite unused, save as a receptacle for lumber, of which the most remarkable example is the remnant of a gigantic horse made by Donatello to travel on rollers in some old Paduan pageant.

From the Palazzo della Ragione we found our way to what must, so long as it lasts, be the great glory, as it is the chief charm, of Padua,—Giotto's Chapel, founded in 1303.

This stands in private grounds, and on one side of a desolate green walk which leads up to a private house, to which it now forms an appendage. From the first it was a little private chapel, and in no respect remarkable for size or costliness of material or design. The plan is a simple oblong nave with an apsidal chancel, and a sacristy on the north side; and nothing can be simpler than the exterior. The walls are of brick, divided into bays by narrow pilasters. The west door is round arched, as are also the windows. The interior is even more simple; the whole nave has not a moulding, the walls are continued on into the semicircular ceiling without any cornice, and all the ornament is added in color.

The windows all have a deep splay outside, very simple stone traceries, and glass fitted to wooden frames placed inside against the stonework. There seem also to have been shutters outside, for which the hooks still remain. A sort of pent-house, or perhaps a cloisterroof, was carried along in front of the chapel, but of this naught remains but the corbels which carried it. There is no more to be said about the exterior than that it is simple and good of its kind, the kind being very humble.

Let us go inside, and we shall pass a very different verdict. Giotto is to many of us not only a person singularly gifted in a great age, but in some sort the embodiment of an idea. The idea is that of an artist, pure, simple, and direct in his work, who should excel equally in all the arts, and show, even though his work be an exception to all rules, the consummate success of such a course. The man was fortunate in his day and in his friends. Here, where we stand to admire, he painted, whilst probably Dante looked on. For merely human and artistic interest there is, therefore, no room which more rightly deserves to be the object of endless pilgrimages; and there is none in which one will find the artist more faithful to his calling, more full of recollection and self-restraint than in this.

I know, therefore, no one building, of such very small size and cost, which can claim the same degree of interest as this small Chapel of the Arena. It is, indeed, one of the glories of art that the works of its great masters cannot diminish in value, or even be competed with by subsequent masters: when once done, they are done forever; and so the Pietà of Giotto, in this little chapel at Padua, is now—as it was when first painted in the commencement of the fourteenth century, and as it will continue to be so long as the neglect with which it is now treated allows it to exist—one of the great paintings of the world, one of those fountains from which school after school and age after age of artists may drink instruction and knowledge, and never fail to gain

more the more they study its many excellences, and its intensity of feeling and conception.

The architectural portion of the interior may be first of all described. The apse is simply a sanctuary, and the chancel is formed by marble screens on each side of the nave, leaving a broad entrance-way between them, and enclosing about one third of its length.

Against the west side of these screens are altars, each with a small carved marble re-dos; whilst on the east of them are steps leading to the two ambons; that on the north being a book rest, carved in marble, and fixed with its face to the east; that on the south of iron, and turning upon a pivot. Between these screens and the sanctuary arch are modern stalls on each side. The sanctuary has seats all round the apse (except in the eastern bay), each with a delicate white marble canopy. The sacristy is groined, and has a thirteenth-century press of wood of a design rather curious than beautiful, but very rich in its detail. In the nave, as I have already said, the walls

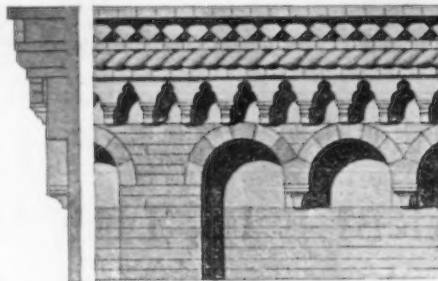
have neither cornices nor stringcourses to break their even surfaces, and their face is continued on in a semicircular wagon vault. There are six lancet windows on the south, none at all on the north, and a three-light window very high up in the gable at the west end above the doorway.

The architectural merit of the building is simply, I think, that it performs satisfactorily the office of giving ample unbroken surfaces of wall for paintings.

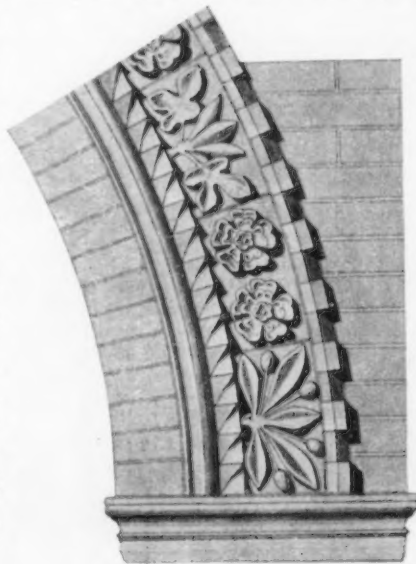
The arrangement of these is very regular. The vault is divided into two parts by wide colored borders, the space between which is painted blue, powdered with gilt stars, and in each bay there are five small medallions with figures on a gold ground. The side walls are divided by borders into three divisions in height, the upper division containing subjects from the life of the Blessed Virgin, the central, those illustrative of the life of our Blessed Lord, whilst those nearest to the ground are representations of the Virtues and Vices opposed to each other,—the last division tinted only in one color, the others richly painted in bright colors upon a field of blue.

The borders which divide the paintings are very well designed, their patterns being always very clearly defined with white leading lines, and a line of red on either side always accompanying each line of white. The paintings themselves are very wonderful; there is an earnestness of purpose and expression about them such as one rarely meets with. Each subject is treated with a severe conscientiousness, not always conventionally where a departure from strict rule is for any reason necessary, but still, generally speaking, in accordance, no doubt, with the ancient traditional treatment. This, illuminated as it is by the thought and love and earnest intensity of feeling which Giotto lavished on all that he did, makes his work here the most perfect example of a series of religious paintings that I have ever seen. Of course in such a large series of subjects there must be great variety of excellence, and I am content to agree with the rest of the world in awarding the palm of excellence to the Pietà, in which the expression of intense feeling in the face of the mourners over the body of our Lord is certainly beyond anything of the kind that I know.

The series is very complete, and, beginning with the history of Joachim before the birth of the Blessed Virgin (the seventh subject),



CORNICE. S. CHIARA. PADUA.
SUPPLEMENTARY ILLUSTRATION. (FROM STRACK.)



ARCHIVOLT. S. FRANCESCO. PADUA.
SUPPLEMENTARY ILLUSTRATION. (FROM STRACK.)



CHURCH OF SAN ANTONIO AT PADUA. SEE PLATE 87.

SUPPLEMENTARY ILLUSTRATION TO "BRICK AND MARBLE IN THE MIDDLE AGES."

is continued down through the leading acts of our Lord's life to the descent of the Holy Ghost on the day of Pentecost;¹ whilst the west wall is occupied by a Last Judgment, and throughout the subjects our Lord, the Blessed Virgin, and the Apostles are always represented in vestments of the same color.

Most of these paintings are in very perfect condition and the *tout ensemble* is nearly as charming as it was when first painted. I was sorry, however, to notice some of the paintings lined all over by a recent copyist, and much damage has been done by damp, especially in the Last Judgment on the west wall. I do not care very much for the painting on the lower part of the walls. The figures of Virtues and Vices are very finely designed, but the imitations of marbles and mouldings painted in perspective were, I hope, being the last work to be finished, done after Giotto had completed his work.

Close to Giotto's Chapel stands the great and, to an English eye, singular church of the Eremitani. It has a very broad nave of immense length, unbroken by aisles, and roofed with one of the cusped roofs already noticed at Verona, in which the real construction

¹ Since this was written the whole of these subjects have been published by the Arundel Society, and Mr. Ruskin's notice of them has also been given to us. They are very valuable as exemplifying, as well perhaps as colorless engravings can do, the exceeding value and originality of this series of paintings. It is to be wished that they may produce some effect upon the minds of our modern artists, who much require to take home to themselves the lesson of sincerity and earnestness of purpose, combined with the highest kind of subject, which Giotto so eminently exhibits in all his works. An extremely good series of photographs of the whole of these paintings may now also be obtained in Venice.

is (with the exception of the tie-beams) entirely concealed by boarding on the under side, this boarding being generally arranged in a succession of large cusps or curves. The effect here is, I think, very heavy and unsatisfactory, but we must bear in mind that the span is prodigious, and the pitch of the roof very flat. The chancel and an aisle on either side of it open into the east end of the nave with three arches, and look so small as to be more like mere recesses than important integral parts of the plan. There are in this church a great many frescos and paintings of much interest, among which are some by Mantegna, in a chapel on the south side of the nave, which are worthy of careful study as being, probably beyond almost any other wall paintings which exist, an evidence of the fact that interest in treatment of subject, drawing, and design of consummate excellence, perspective and decorative coloring of the walls, may all be included in a fresco without interference with the wall surface, or indulgence in tricks of chiaroscuro, without which no painter now seems willing to do his work. Yet if Mantegna cheerfully accepted such rules for his wall painting, would it be beneath modern painters to do the same for theirs, and could they ask for a better teacher or guide than this consummate artist?

Less interesting to the artist than these works of Mantegna are the paintings in the apse executed by Guarienti in the middle of the fourteenth century. Here are figures of the planets, the Sun, Moon, Venus, Mercury, Mars, Saturn, and Jupiter, each with allegorical

figures, male and female, of the Seven Ages of Man influenced by the planets.¹

At the west end of the nave is a great painted rood, one of those curiously shaped crosses meant to receive a painting of the Crucifixion instead of a carved figure, and cut round with quaintly carved and cusped indentations, of which so many examples remain, though they are generally found now in picture galleries. This no doubt stood originally on a rood beam, where one sees such a rood represented in one of the wall paintings in the upper church of S. Francis at Assisi.

When I was last at Padua the west front of this church was being repaired, — a very dangerous and terrible operation in Italy, where, so far as I have seen, there is less feeling for, or knowledge of, Gothic architecture than in any other part of Europe. The interior, too, has been ruined by the way in which the old ceiling has been painted, in blue and shaded white. In a building whose characteristic feature is a certain grand simplicity and austerity, it is especially disgusting to see light and tawdry coloring introduced, seeing how completely out of harmony with the whole idea of the church it is.

At the west end are some fine monuments of stone and marble boldly corbelled out from the wall, adorned with good carving of foliage, and angles looking out from circles.

The east end is less altered than any part of the exterior of the building. The immense gable of the nave is divided into four parts, the outer of which have lancet windows, whilst in the centre is an insignificant apse, which is almost exactly repeated on the east side of the south transept. The large sacristy on the north side and a campanile of not much interest on the same side redeem, to some extent, what would otherwise have been a most uninteresting elevation. The windows here have a wide external splay, semicircular arches, and stone trefoil heads inserted rather clumsily under the arches.

What a grand idea it was on the part of the preaching orders to build these enormous naves for their congregations! Here, when enthusiasm for preaching was newborn and general, a congregation, numbered rather by thousands than by hundreds, may have gathered round the preacher, all within sight of him, and, with the aid, probably, of an awning stretched across the church over the pulpit, all within sound of his voice.

From the Eremitani we found our way, with some difficulty, through miserable streets to the church of Sant' Antonio, probably the most remarkable architectural work in many respects in this part of Italy.

It seems that about A. D. 1231 it was determined to erect a great church in honor of St. Antony, the patron of Padua, and Nicola Pisano, then one of the most eminent men of his day, was sent for to undertake the work.² The view of the exterior which I give will best serve to show in how singular and original a manner he accomplished his work. St. Mark's, at Venice, must have been in his eye when he designed his church, and the crowd of cupolas which form its roof remind one forcibly of its most distinguishing feature.

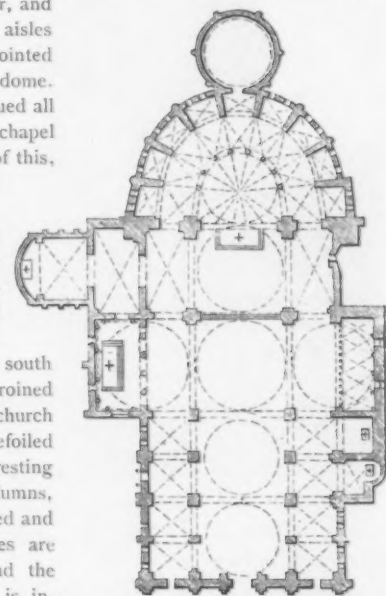
On first sight Sant' Antonio certainly does not prepossess the beholder in favor of such a bold departure from every-day rules of art. It is built almost entirely of a light-red brick, not much better than the common London brick in color, a poor material wherewith to attempt the construction of a noble church. Stone is used very sparingly in the voussoirs of the arches and elsewhere. The cupolas are heavy in their effect, but relieved by that over the intersection of the nave and transepts, which rises higher than the others, and is certainly striking in its design and outline, which is, for the main portion of its height, that of a simple cone. Round and pointed arches are used indis-

criminately, and the walls are divided everywhere by pilasters, and surmounted by arcaded corbel-tables, in all these respects giving the building the appearance of being much earlier than it is. The west front is very peculiar, and recalls the fronts of the churches in Vicenza which I have described, and is entirely unlike any of the churches of Pisa, which would hardly have been the case had it really been designed by Nicola Pisano. One great flat gable with an arcaded eaves-cornice finishes the whole, and out of its apex rises a tall polygonal turret, almost as high as the dome in front of which it stands. The lower part of the west front has a central entrance of mean character, and on either side two unequal arches of construction, the walls within which are pierced with windows. Above these, and just beneath the great pediment-like gable, is a long arcade of simple pointed arches, behind which a passage and three windows opening into the church. This front is a sham front, and not excusable on account of its grandeur or its beauty. Indeed, had it followed the outline of the fabric, it would have been neither ungainly nor heavy, both of which it most assuredly is now.

The interior is striking from its height, but cold in the extreme in effect; the domes are all whitewashed in the brightest and freshest manner. The plan gives three domes to the nave, one and an apse of seven bays to the choir, and one to the transept. The aisles open into the nave with pointed arches — two to each dome. The choir aisle is continued all round the choir, and a chapel is thrown out to the east of this, which is again crowned with a dome.

The north transept contains the chapel of the patron saint, full of gorgeous ornaments of all kinds, but not very ancient. Opposite it, in the south transept, is a curious groined chapel, divided from the church by five-pointed and trefoiled arches of yellow marble, resting upon classical-looking columns, and all very richly painted and inlaid. Above the arches are five statues in niches, and the intermediate wall surface is inlaid with white and red marble in a regular pattern, such as we have seen in the pavement of Sta. Anastasia at Verona, with very good effect.

The cloister on the south side of the church is very large and good, and some fine arches occur in it, composed of black and yellow marble with bricks of varied color introduced. On its east side three open arches, filled in with a double iron grille, open into what was, no doubt, the chapter-house. Going from this into a second cloister to the east of it, no one can fail to be struck by the extreme picturesqueness and novelty of the view. In the foreground is the simple pointed arched and open arcade of the cloister; above this rise the gable of the south transept and the eastern apse with its surrounding aisle, and two lofty octagonal brick turrets, on each side of the apse, which look like minarets from Cairo, and, combined with the collections of domes on the roof, give a completely Eastern effect to the whole view. If, however, the detail of this striking building is examined, one can hardly be satisfied. There is throughout, as there so often is in Italy, a sad want of skill and neatness in the adjustment of details as compared to what is common in northern Gothic buildings. This indeed is a feature of all the works of the Pisani, and gives them the character — so common and so fatal in modern works — of being to a great extent the work of assistants and not of the master. Nothing



PLAN OF SAN ANTONIO.

¹ The order of the planets attached to the seven ages is as follows: I. The Moon. II. Mercury. III. Venus. IV. The Sun. V. Mars. VI. Jupiter. VII. Saturn.

² This is the tradition, but it is one which is not, I think, supported either by documentary evidence or by the style of the building. Nicola left Padua four years before the church was commenced; and Fra. Carello is mentioned in the archives of the convent as one of the architects, of whom, no doubt, there were several before the work was finished.

can be much more clumsy than the provision for the steps leading to the turrets, nor weaker than the rectangular tracery inserted in the circular window of the transept. This, however, is a work of the middle of the fourteenth century, and Nicola Pisano, even if he were the first architect of the church, would not be responsible for it. I cannot say that I was at all satisfied either with the internal or external effect of the church, though it must be confessed that, when seen from a distance, there is excessive grandeur in the grouping of the multitude of domes, with the steep cone rising in the centre, and giving point and emphasis to the whole.¹ The arrangement of the windows and arches round the apse, for instance, is confused and weak to a degree; and I do not feel that Nicola Pisano has fairly settled the question of the adaptation of the dome to pointed buildings by his treatment of the domes here. The question is still, I think, an open one; and though it may be doubted whether, with our present opportunities, it will soon be satisfactorily answered, I still feel that it would not be difficult to answer it far more successfully than has been done here.

In the evening we heard some very fine music of ancient character in Sant' Antonio, after which there was a sermon, and, though it was a week day, there was a large congregation, very attentive and quiet.

The Duomo is a cold, unattractive church, — said, however, to have been designed by Michael Angelo, — and rather bold in the treatment of the pendentives under its dome. By its side stands a Lombard baptistery, the interior of which I did not succeed in getting a sight of; and I believe that I missed some valuable examples of fresco painting with which its walls and domed roof are covered.

We wandered about the melancholy streets of Padua, searching in vain for objects of any interest to our antiquarian eyes. It is true that the columns and arcades which support the houses are, many of them, ancient, but they are of a character very common throughout the North of Italy, and were not sufficiently novel or striking to draw off our attention from the melancholy and dilapidated look of the houses and shops which they half concealed and half supported. We saw also one or two old monuments at the corners of streets, — one of them called the "Tomb of Antenor," — similar in their idea to those which are so frequent in Verona.

The next morning, therefore, saw us making our way to the railway station for Venice, sad only in leaving Padua that we could not spend more time there for the study, more quietly and carefully, of the lovely little Arena Chapel and the paintings of Giotto.

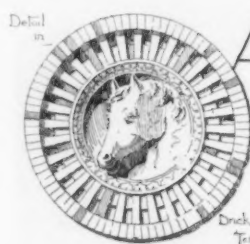
(To be continued.)

SOUTHERN COLONIAL BRICK.

MR. EDWARD WARREN DAY in *Putnam's Monthly Historical Magazine* for August, 1894, gives some most interesting data concerning the production of bricks in the neighborhood of Virginia during colonial times. It is a widespread belief that most if not all of the bricks for the earliest buildings erected in this vicinity were brought from England, but Mr. Day, in a search through the early records, which contain invoices of the cargoes of vessels coming to this country, finds no mention whatever of bricks. It has generally been supposed that bricks were brought as ballast, but ballast, according to Mr. Day, was seldom necessary with the heavy cargoes and small vessels common in the trade of this time. On the other hand, there are several entries on the colonial records concerning the arrival of brick-makers, who doubtless came to practise their trade, as is evidenced by the following bill, which was presented to the council of James City Country in 1708, for the construction of the parish church at Williamsburg: "150 loads of wood at 12s. per load, moulding and burning 70,000 bricks at 3s. 6d. per M. The remains of many old brick-making plants scattered through this region, and the excellence of the clay found here, together with the testimony of the records, lead Mr. Day to the conclusion that the bricks for the earlier buildings were made in this country. The entire lack of documentary evidence to the contrary would seem to support this view.

¹ The eastern chapel and dome are comparatively modern, and the coverings of the other domes appear to be also modern; but I suppose they follow the old outline.

RECENT BRICKWORK IN AMERICAN CITIES



ABOUT twenty-five years ago the term "the best Baltimore brick" meant the best of its kind to be found in this part of the world, or indeed — in the assurance of pardonable local pride, and, possibly, some ignorance — anywhere else. Perhaps this is equally true to-day, but, while in popular opinion it then stood almost alone in its superiority, it now has many rivals of various kinds and degrees of merit, and, moreover, the very qualities themselves that at one time are regarded as desirable, or even essential, at another, for many purposes and various reasons, are no longer preferred. At that period a façade of "forty-dollar pressed brick," with finest cut white mortar joints, was regarded as the best possible piece of brickwork that could be put together, not only from the bricklayer's point of view, but also from that of the educated public, and undoubtedly it was exceedingly red and white and smooth and "neat" and monotonous. A large majority of the fronts of the most important and expensive houses were erected in this style, and when this was combined with the whitest and smoothest Maryland white marble, as a "trimming," the acme of perfection in architectural design for a street façade was supposed to have been attained. The Philadelphia specialty of solid white wooden shutters never obtained, — scarcely a single instance of it appeared, for which a past and present community are duly grateful.



J. L. WHITE'S STABLE, BALTIMORE.

A few entire fronts of brownstone or white marble were erected during the same period, but they were a small minority, the brownstone, being chiefly Connecticut, soon showed its conspicuous qualities



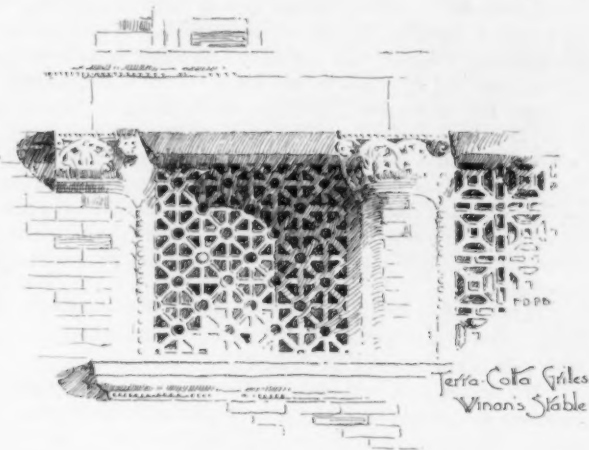
A. S. ABEL'S STABLE, BALTIMORE.

of rapid crumbling and decay, and justly fell into disfavor. These brick and white fronts at first showed the influence, in detail, of the better forms that had preceded them, and which had come down from the good things of the "Colonial Period." But little by little, as carpenters and builders assumed the *rôle* of architects,—apparently in proportion as they grew to know less of architectural forms,—these fairly good designs fell from bad to worse and finally to abominations in the cheaper work, covering miles of desolation: the marble was abandoned for painted white wood, and forms and proportions of detail, impossible in any natural use of either wood or marble, took the place of appropriate and legitimate ornament. One inherent weak point belonged to even the best of these expensive brick fronts. On account of the cost, they were all laid as "stretchers" forming a four-and-a-half-inch screen in front of a common brick wall, laid up entirely independent of it, and to which it was only bonded here and there by a cut brick. But this was only one of their many bad qualities both of construction and design, which generally asserted themselves sufficiently to bring disfavor upon the style, and to-day we see little of it, except in its cheapest and most degraded form, not to be classed as a style in any sense.

These good things of a quarter of a century or more ago were, as we have said, the children of a very good period preceding them, direct Colonial descendants, solid, spacious, comfortable, old brick buildings, many now over a hundred years old, built in "Flemish bond," often of imported English brick, with bits of classic doorways and windows and cornices, sometimes of marble, sometimes of wood, highly respectable and dignified old specimens that here and there still appear in the older streets, suggesting pictures of prosperous, aristocratic social life of past generations, now generally put to sadly debased uses, but still looking down with a certain dignity on their vulgar surroundings, giving the impression to the passer-by that their degradation has all come from without, and that within themselves there was still left sufficient virtue and vitality to enable them, with the judicious help of a restoring hand, once more to assert their merits and become comfortable and attractive dwellings, suited to the social life of to-day.

In Baltimore, the architecture of those days, and up to the be-

ginning of the decadence of thirty years ago, was, in kind, as good as the best of the same kind elsewhere in America. New York, Boston, and Philadelphia were the only other cities ranking with it; what was regarded as good in one was also good in the others, both as to design and construction; the architect as he is known to-day was about



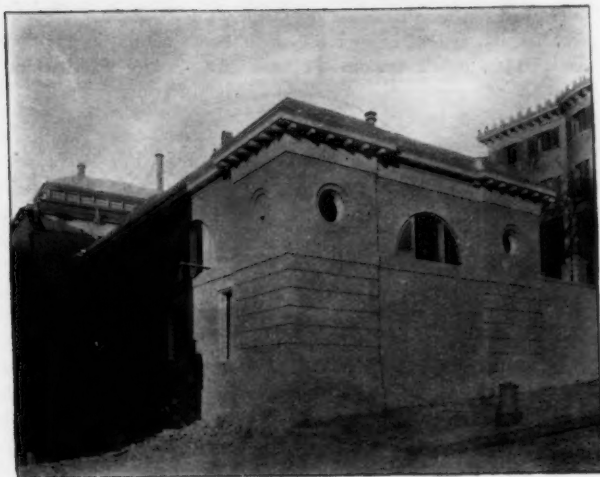
as rare in one place as another, the good things were all derived from very much the same sources; just where they came from we will not stop to discuss.

The good Colonial specimens are now familiar to every one from numerous publications. A series of examples, their legitimate descendants in the later period in Baltimore, are not so well known, but strike the artistic eye of the stranger whenever he runs across them as something of a specialty of the city. We refer to numerous



UNITARIAN CHURCH, BALTIMORE.

small brick stables to be seen here and there through the streets, often attached to dwellings of the best and most expensive class, and which are quite conspicuous examples of good proportions and



THE THOMAS STABLE, BALTIMORE.

effective results with character obtained with a perfectly natural and simple use of bricks. Of these we give a few illustrations of the best.

The Winans stable does not, however, belong to this period, being a bit of recent work, done only a few years ago. The terra-cotta "grilles," which are shown belonging to it, and which were made from the architect's designs by a firm in this city, is the only instance we know of such detail in terra-cotta. The effect is excellent.

The bit of terra-cotta from the pediment of the Unitarian church is the only instance we know of any terra-cotta ornament being used in the older work in Baltimore.

Between this period and the really good things of the last ten years that have reappeared in brick and terra-cotta was a veritable "dark age," an epoch of the most totally meaningless and frivolous use of brick in the attempt to obtain vulgar ornamentation where it was not needed, a style of work begun cautiously, with some intelligence, by a few architects, examples of which may be distinguished amid the mass,—bits of brick carving or terra-cotta panels, of no special artistic merit, but within legitimate lines; but this field once entered was seized upon with such avidity by the speculative builder that the architect, in terror at what his timid attempts had brought upon the city, retired in disgust, while "fools rushed in" where he dared no longer tread. We know of no city, save Washington, perhaps, that can rival Baltimore in the quantity and quality of this brickwork abomination, and, alas! the work still goes on in rows of cheap and worthless houses.

IN the inter-club competition under the auspices of the Society of Beaux Arts Architects, the club awards were given to New York, Boston, and Philadelphia in the order named.

CLEVELAND ARCHITECTURAL CLUB.

THE CLEVELAND ARCHITECTURAL CLUB, with a charter membership of fifteen, was organized Thursday evening, November 22, for the study of architecture and the allied arts, and persons interested in this study are eligible to membership in the club.

Upon the first and third Thursday evenings of each month regular meetings will be held, the last evening of the month being for competitions. The subject for the December competition is a "Stone Entrance to a Residence."

The club is officered as follows: President, John W. Russell; Vice-President, Harry S. Nelson; Secretary, Herbert B. Briggs; Librarian, B. S. Hubbell; Treasurer, E. E. Noble. Members of executive board, W. D. Benes and Willbur M. Hall. The officers, with the following, constitute the charter membership: Robert Allen, Frederick Baird, G. B. Bohm, P. G. Griffin, Willard Hirsh, Ray Rice, C. S. Schneider, and Albert E. Skeel.

All communications should be addressed to the Secretary, at 40 Blackstone Building, Cleveland, Ohio.

HERBERT B. BRIGGS, *Secretary*.

CHICAGO ARCHITECTURAL SKETCH CLUB.

REPORT ON THE ROBERT CLARK COMPETITION.

THE jury appointed to award the medals for the Robert Clark Competition submit the following:—



THE OLD JOHNS HOPKINS STABLE, BALTIMORE.

The competition as a whole was a decided success. The draughtmanship excellent, with but few exceptions. Considering the age limit of thirty years, the same cannot be said of the main feature in a competition, that is, that a building shall look like and suggest what it is intended for. The great majority of contestants submitted designs too suggestive of art galleries, institutes, etc., too monumental in their arrangement of parts, and the disposition of detail too lavish.

Sixty-five designs were submitted, aggregating one hundred and thirty drawings of an unusually high order of merit.

The selections were finally narrowed down to

four designs, and awards were made by written vote of each judge.

For Gold Medal, WILLARD HIRSH, Cleveland, O.

For Silver Medal, EDWIN R. CLARK, Lowell, Mass.

For Bronze Medal, ERNEST F. GUILBERT, Chicago, Ill.

Mention, ALBERT KAHN, Detroit, Mich.

The drawings will be exhibited next month at the Art Institute, and immediately thereafter be returned to their owners.

JOHN ROBERT DILLON, *Secretary*.

I DO not feel able to speak with any confidence respecting the touching of sculpture with color. I would only note one point, that sculpture is the representation of an idea, while architecture is itself a real thing. The idea may, as I think, be left colorless, and colored by the beholder's mind; but a reality ought to have reality in all its attributes; its color should be as fixed as its form. — *John Ruskin*.

THE ART OF BUILDING AMONG THE ROMANS.

Translated from the French of Auguste Choisy by

ARTHUR J. DILLON.

CHAPTER II. — CONTINUED.

II. VAULTS WITH ARMATURES OF BRICKS LAID FLAT.

ARCHES of brick, such as those in the Basilica of Constantine, had the advantage over the continuous system of Plate I. of requiring much less material, while filling their rôle of supports quite as satisfactorily. Nevertheless, at an equal cost, a continuous armature would have been more convenient; so it would seem only natural to seek some arrangement of the materials which would combine with the merits of the preceding system that of continuity in the supporting surfaces, and it is probable that the second system of supports found in the Roman vaults had its origin in this desire.

The armature, under this system, was made by laying large bricks, ordinarily two Roman feet (sixty centimeters) square by four to five centimeters thick, over the entire convex surface of the centring, in good plaster or quick-setting mortar, so as to make a thin and unbroken envelope which followed the form of the intrados of the vault and resembled a sort of curved paving. (Fig. 27.)

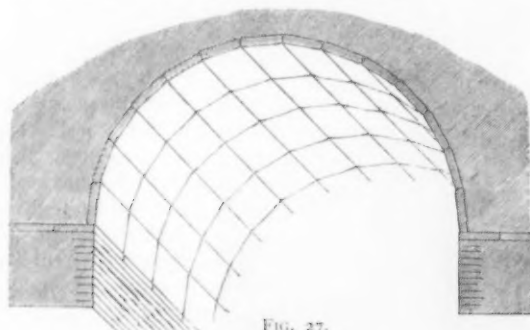


FIG. 27.

This sometimes constituted the entire armature, but, ordinarily, there was laid on it a second layer of bricks, of smaller dimensions, forming a second envelope exactly like the first, and bound to it by the interposition of a bed of plaster or mortar. These layers together formed a protective crust, a thin vault, covering the entire centring (Fig. 28), which, though not able to hold its own weight if

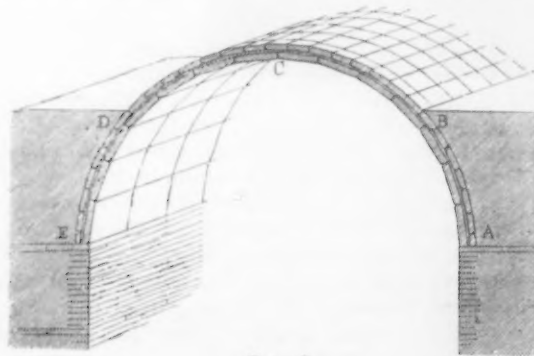


FIG. 28.

the centring was removed the moment it was completed, would become firmer as the rubble was laid, and would eventually be able to support alone the entire upper part of the vault. In fact, the obstacle to the immediate removal of the centring lay not so much in the thinness of this crust as in its semicircular form; for a vault of

bricks laid flat-wise is stable only under the conditions of being a very flat arc, and of being rigidly held by its abutments; but being semicircular, it will acquire the necessary stability if a backing is

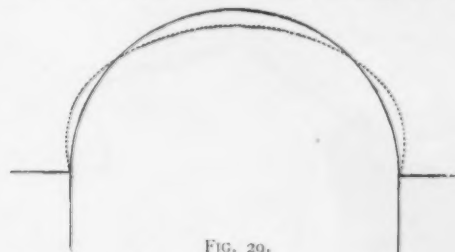


FIG. 29.

placed on the flanks A B and D E (Fig. 28) to prevent its deformation; and this evidently was the case in the Roman armatures of flat-laid bricks: the rubble did not commence to bear on the centring until its first courses had reached a level such as B D (Fig. 28), at which time the part of the armature which carried the load, the really supporting part of the tiling, was reduced to the small arc B C D, and was under the best conditions of stability. It would, indeed, have been possible to remove the centring when the rubble had reached the level B D, to set it up as it was needed at other points, thus building the vault in sections, and using the same centring again and again for succeeding parts. This was, in fact, a process often followed by the Romans; to be convinced of it, it is only necessary to examine the armatures. It will be seen that the joints, instead of being broken, are continuous, and that the bricks are laid side by side, like the squares of a checker-board (Fig. 27), agreeing with the supposition that the construction was by sections; for, if the bricks had been laid with broken joints, each section would have terminated in toothings, and there would have been some difficulty in joining the adjacent sections to it; hence, the ancients, suppressing all bonding between the sections, avoided the trouble that would otherwise have arisen in joining them together.

The economy in centrings is evident; it was sufficient, as was remarked in an analogous case, to make the centring strong enough to support the first of the layers; this, in turn, served as the centring for the second, and, with it, formed a support strong enough to carry the entire weight of the rubble.

The incomplete vault shown in the following drawing (Fig. 30) will serve to emphasize the general scheme of the system of supports built of flat-laid bricks; it is taken from the Baths of Caracalla, perhaps the greatest edifice in which the system we are studying was used. Here there is a first layer of bricks two ancient feet (sixty centimeters) square, and about four or five centimeters thick, a second layer of smaller brick, measuring about two thirds of an ancient foot, approximately twenty centimeters, and, in addition, a number of isolated bricks placed on edge, like headers, in the second layer, forming projections on the extrados of the armature.

The uses of the different parts of this singular construction have already been explained, and the progress of the work itself is not difficult to follow. On the trusses of the centring there was nailed, not a continuous lattice, but narrow planks (Fig. 30) spaced about two feet from centre to centre, and on these the larger bricks were laid as quickly as possible; the wooden covering of the centres was thus extremely cheap; and, moreover, the first bed of bricks could be laid with great rapidity because of the large surface covered by each brick. The first bed being completed, the second could be laid in less haste, and could, therefore, be of bricks of smaller size; and almost invariably, those of the second layer are less than those of the first. I know of but one example, the Pantheon of Agrippa, where both layers are of the larger square brick (Plate XIII.), and as the second was intended, as we will see, only to protect the joints of the first, bricks about twenty centimeters square would seem quite sufficient.

Yet it was not enough to give only a firm support to the rubble of the vaults; it was well to insure a certain amount of adherence

between the armature and the rubble, so that when the centring was removed the whole would be as one single, bonded, and continuous mass; with this object in view, bricks were placed here and there, projecting from the second layer, and, as they had a tendency from their own weight to fall flat on the centres, other bricks were placed behind them as supports, as in parts of Villa Hadrian. (Fig. 31.)

Such were the vaults at the time of their construction; but

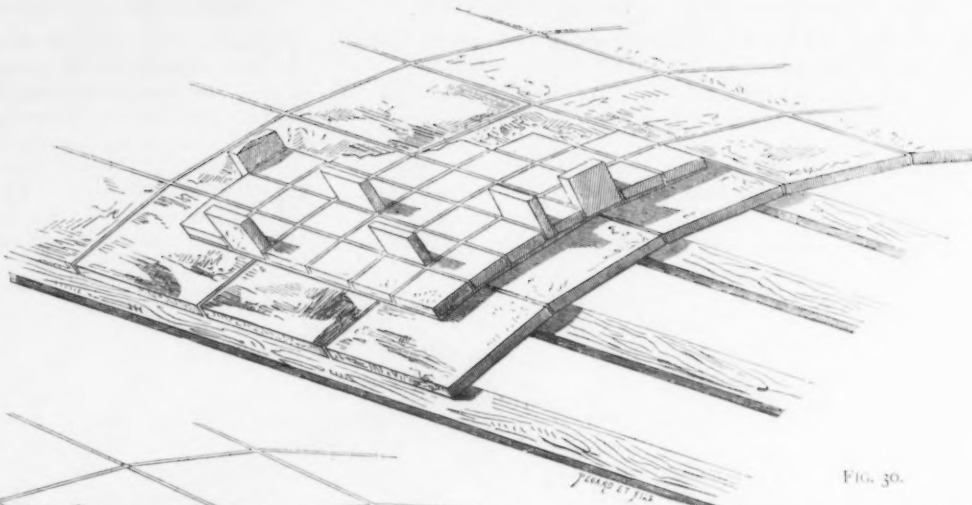


FIG. 30.

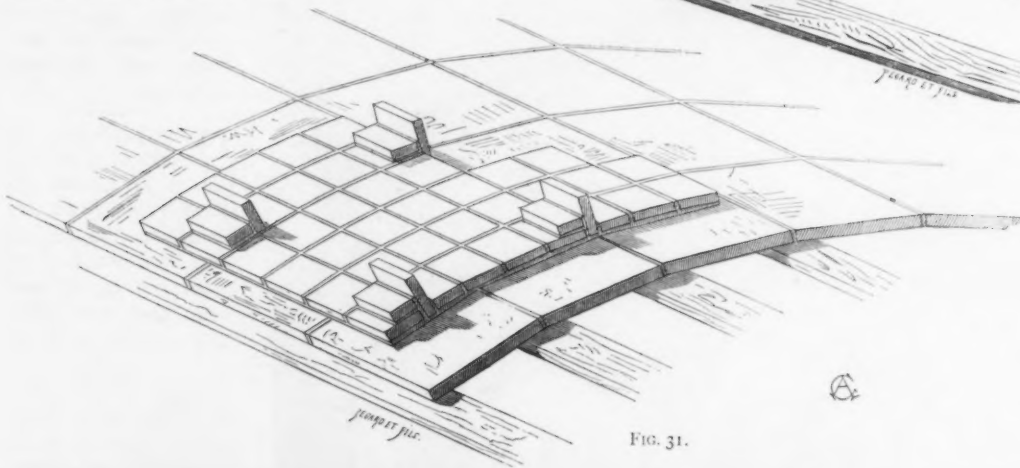


FIG. 31.

one must not expect to find this disposition undisturbed in their ruins. The greater part of the linings of bricks have disappeared, and usually their remains are to be found only near the springing of the vaults, in the re-quadrant angles formed by their meeting with walls, and at the other points where the fragile squares were best protected from destruction. Near the summit of the vaults the double linings of brick are

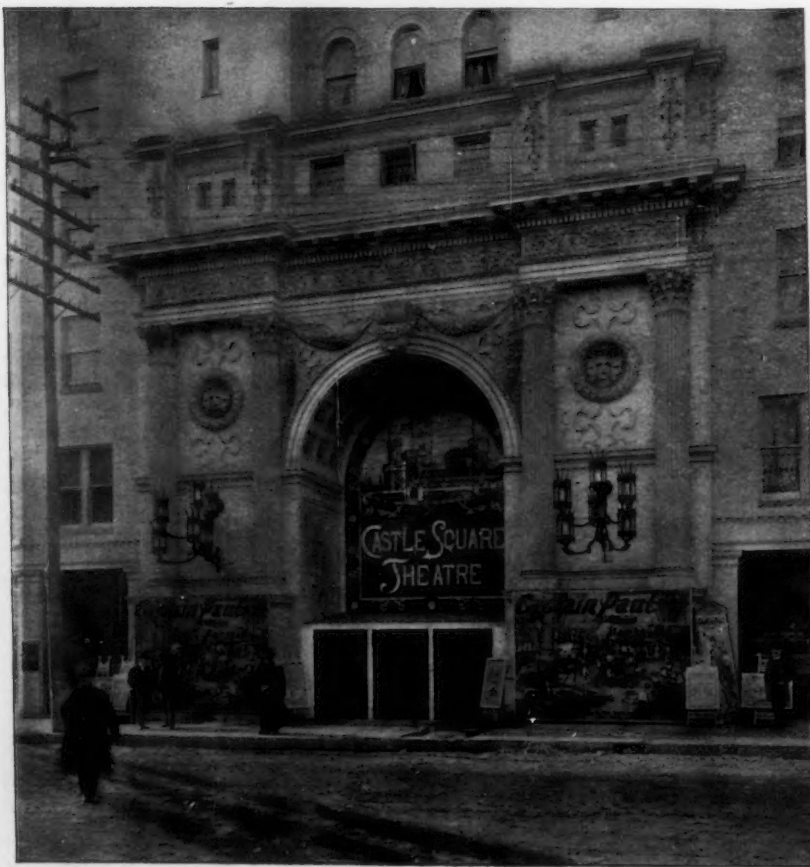
fallen, and the original arrangement of their parts can only be judged from the more or less distinct imprints which they have left in the rough masonry; the only parts which have everywhere been preserved are the headers, whose ends can be seen in slight protection on the face of the rubble. (Plate IV., Fig. 2.) Sometimes both the headers and the bricks which propped them are still in place, swallowed up in the rubble, but of the rest of the armatures there remain only the fragments.

BRICK FOR A BANK RAILING.

A BANK on Main Street, Buffalo, shows how effectively brick may be used for interior work in place of cabinet-work. The wall is finished to a height of several feet with a light shade of Roman shape Pompeian brick, and the bank enclosure up to the counter level is built the same way. A finish of quartered-oak with some Bower-Barffed iron work completes the job. In point of color and attractiveness it is one of the most successful things we have seen.

THE CASTLE SQUARE THEATRE.

ON Plate 92 we reproduce Messrs. Winslow & Wetherell's detail drawing of the entrance to the new Castle Square Theatre, in Boston. This is of white terra-cotta made to match the white brick of the Castle Square Hotel which occupies the front part of the lot on which the theatre is built. The terra-cotta work was done by the New York Architectural Terra-Cotta Co.



THE MANHATTAN LIFE BUILDING, NEW YORK.

THE following data will be of interest and an eye-opener to those of our readers not familiar with large building operations.

Height above Broadway, 347 feet.

Height above base foundations, 400 feet.

Height above tide water, 380 feet.

Time spent building foundation, four and two thirds months.

Time spent in erecting building after completion of foundation, eight months.

Time from commencement of actual construction above foundation until the roof was reached, three months.

The foundation is now for the first time used as an office building, but it has been previously used in supporting many heavy bridges.

Weight of building when empty, excluding foundations, 60,000,000 pounds.

Weight of building when all the floors are fully loaded, 65,000,000 pounds.

Contains 775,000 rivets and bolts.

The superstructure contains 3,500,000 bricks.

Thirty-three private houses could have been constructed with the bricks used in this building.

These bricks would make a single column more than 600 miles high if they stood one upon another.

11,000 barrels of cement were used.

The building contains about thirty-five miles of electric wires, ranging from one sixty-fourth of an inch in diameter to one and one half inches, more than five and one half miles of gas, water, waste, and vent pipes, and about five miles of steam pipes.

EDITOR OF THE BRICKBUILDER.

Sir, — We have noticed your report of the tests made for the Eastern Hydraulic Press Brick Company, by the Watertown, Mass., United States Arsenal. We had tests made at same place, as follows:

Test No.	Description.	Height.	Compressed Surface.	Sectional Area.	First Crack.	Ultimate Strength.
				Sq. in.		Total Lbs. per Sq. in.
7098. No. 4.	Dark buff,	2.42	4.04	8.56	34.58	564,000 800,000 23,135
7099. " 4.	" "	2.43	4.05	8.54	34.59	265,000 626,000 18,098
7100. " 5.	" "	2.44	4.12	8.57	35.31	247,000 346,800 9,822
7101. " 5.	" "	2.42	4.11	8.54	35.10	234,000 423,900 12,077
7102. " 10.	Light buff,	2.35	3.98	8.32	33.11	158,000 607,200 18,339
7103. " 10.	" "	2.32	3.95	8.24	32.55	372,000 612,200 18,808

The above is attested to by J. W. Reiley, Major Ordnance Department United States Army, and by J. E. Howard. We send you the above tests, to show you the quality of our goods. We hereby issue a challenge on test No 7,098 and claim the belt on it.

You will note the capacity of the United States testing machine is eight hundred thousand. Our test No. 7,098 has withstood the machine to its capacity.

T. W. CARMICHAEL, Mgr. Brooke Terra-Cotta Co.

TOWER OF S. CECILIA IN ESTERNO, ROME.

THIS tower is the subject of the present month's Hydraulic-Pressed

Brick advertisement on page vii. Mr. C. Howard Walker, in his articles on Italian brick towers, will write critically concerning this tower as well as others the Hydraulic-Press Brick Companies will publish in the course of their advertisement.

MESSRS. FORBUSH & HATHAWAY have designed a number of very successful school buildings in brick which we hope to publish in the same satisfactory manner as the one at Greenfield,

in this number. It is a pleasure to receive drawings so carefully prepared and so well suited for reproduction. Messrs. Forbush & Hathaway are making a specialty of school work, and have quickly made a reputation in this line.

IN our publication last month of Watertown tests on the Eastern Hydraulic-Press Brick, we omitted, on page 228, to state that in tests 7056, 7060, and 7064 the tests were made on edge. This accounts for the apparent variation in strength, as they could not in this position stand so much pressure as the bricks tested flat. The test as published indicated a variation in strength which is not the case.

DR. FÜHRER, a European archaeologist, has announced the discovery of a two-story temple in India built of carved or moulded brick, and dating from the first century B. C.

WITH the October number the *Engineering Magazine* inaugurated its "Review of the Industrial Press," to

take the place of its "Technical Index." It aims to do for industrial literature what the *Review of Reviews* does for general literature. All we can say is that such a move is of the utmost importance to all technical readers, and the magazine is worth its subscription price for this one thing alone.

MR. H. A. BREDE and Mr. George C. Zimmerman have formed a copartnership for the practice of architecture, with offices in the Kanter Building, Detroit. The old firm of Brede & Mueller has been dissolved by mutual consent. Messrs. Brede & Zimmerman desire to be supplied with samples and catalogues, by manufacturers and dealers.

MESSRS. THEODORE C. LINK, Alfred F. Rosenheim, and William B. Ittner, of St. Louis, all architects of well-established individual practice, have associated themselves under the firm name of Link, Rosenheim & Ittner, for the practice of architecture. They have opened offices on the ninth floor of the Union Trust Building.



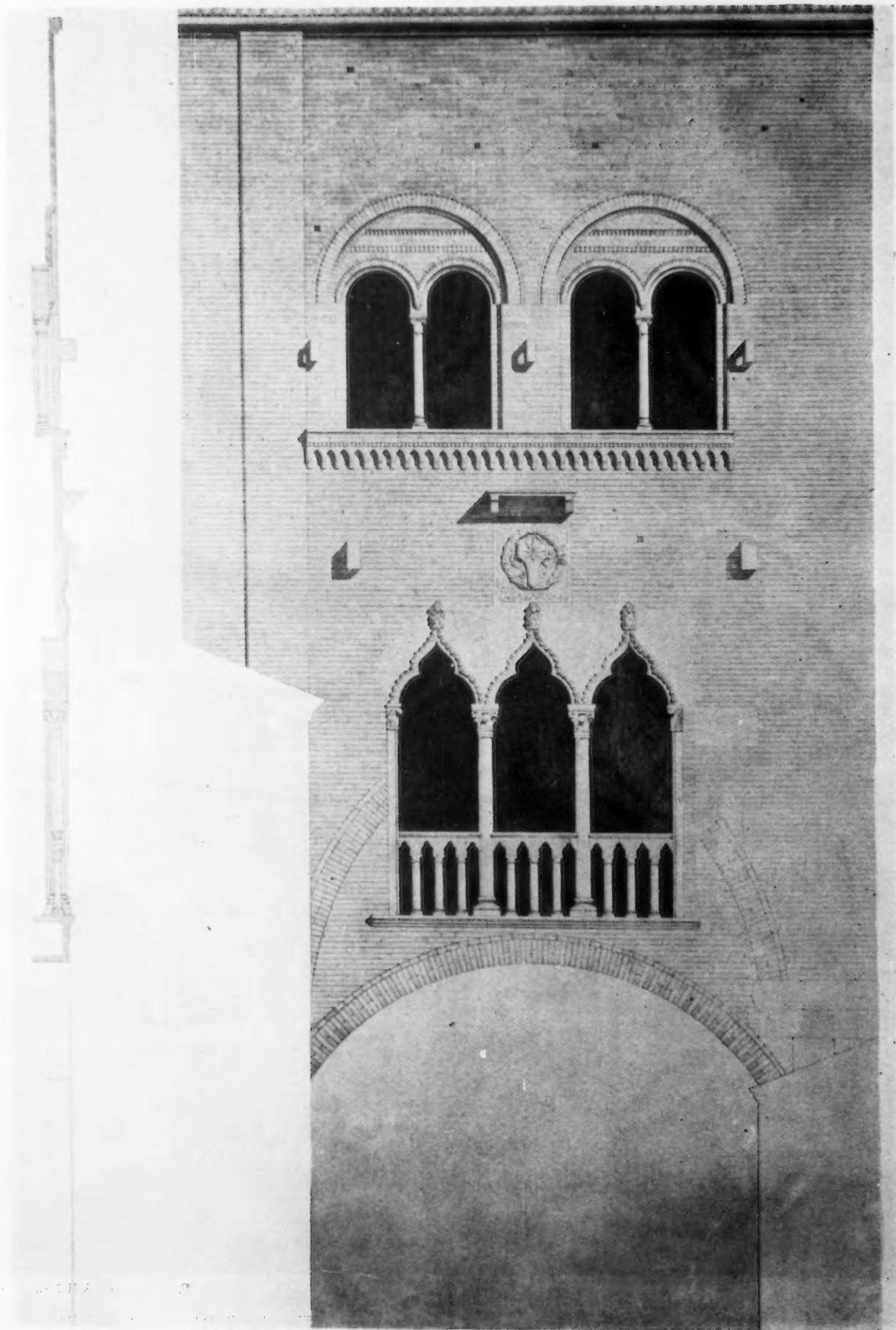
HOTEL RENAISSANCE, NEW YORK CITY.

CLARENCE LUCE, ARCHITECT.

FIREPROOFED BY THE RARITAN HOLLOW AND POROUS BRICK COMPANY.



CHURCH OF SAN ANTONIO AT PADUA. FOR ANOTHER VIEW SEE PAGE 243.
SUPPLEMENTARY ILLUSTRATION TO "BRICK AND MARBLE IN THE MIDDLE AGES."

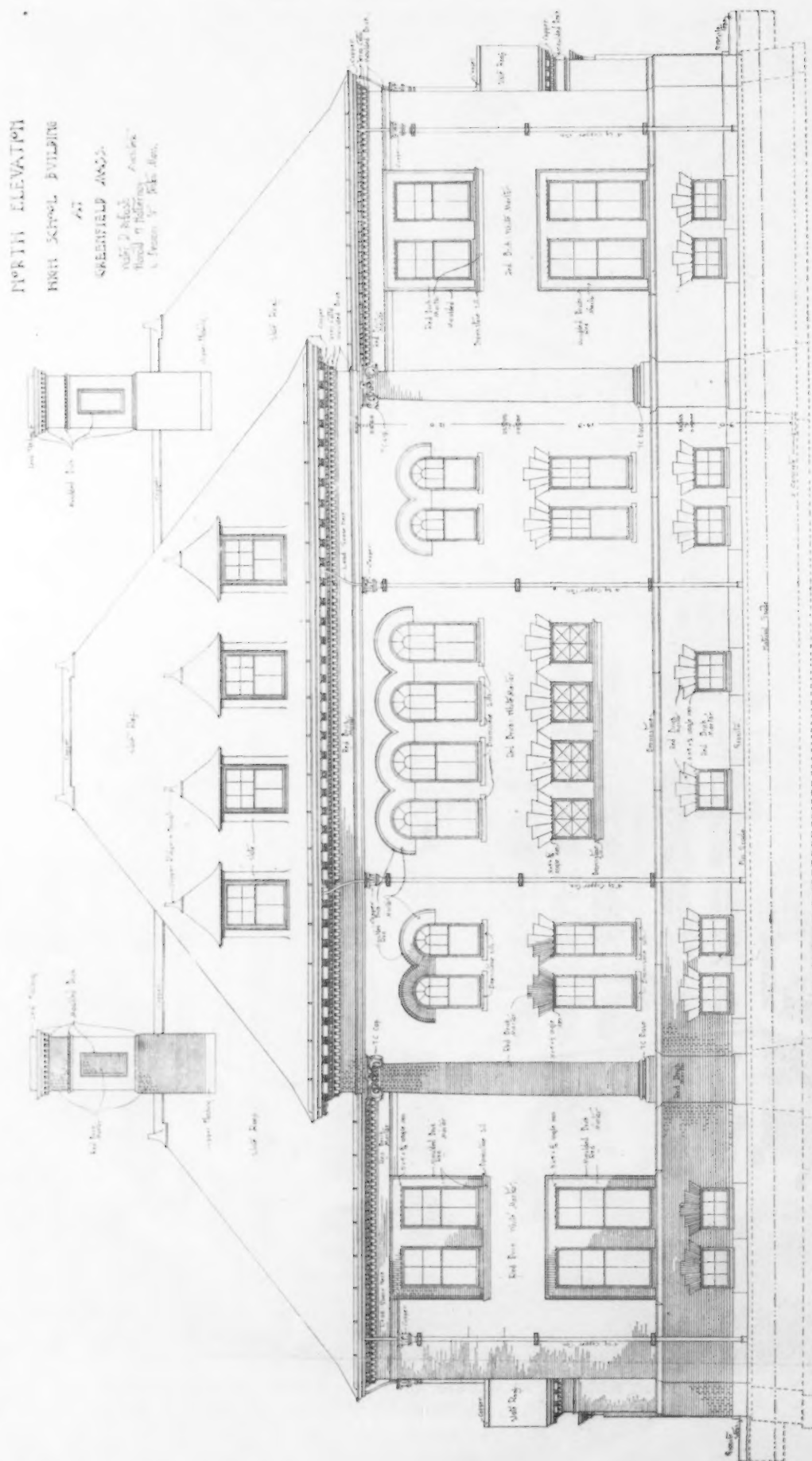


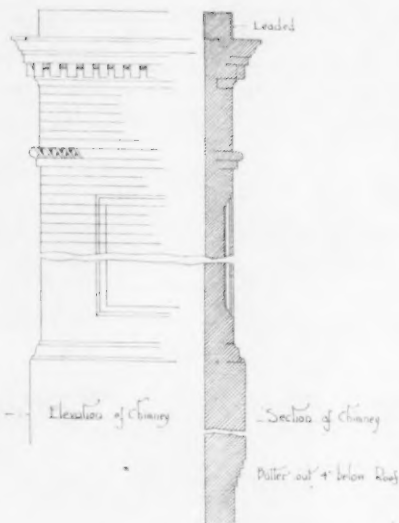
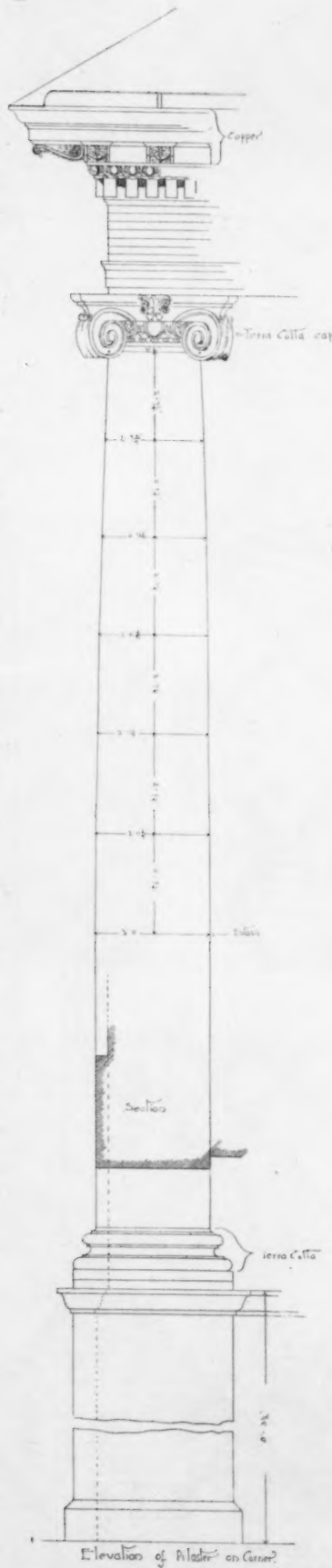
CASA D' EZZELINO, PADUA.

SUPPLEMENTARY ILLUSTRATION TO "BRICK AND MARBLE IN THE MIDDLE AGES." (FROM STRACK.)



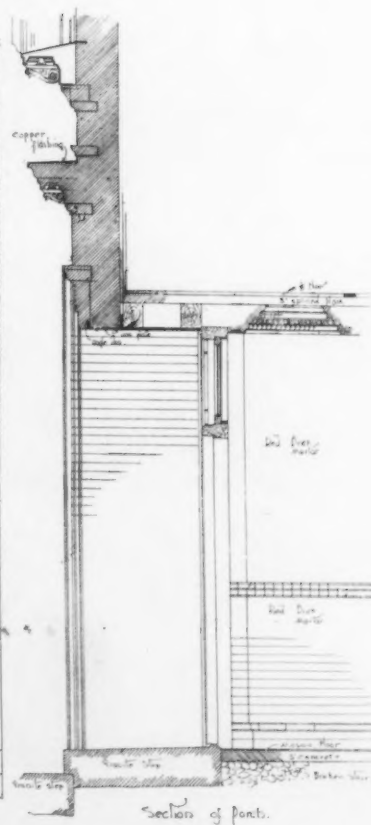
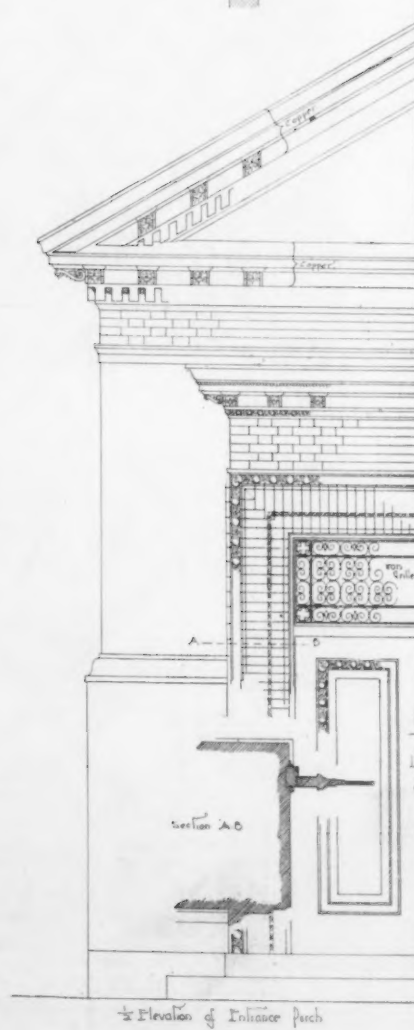
THE PABST BUILDING, MILWAUKEE, WIS. S. S. BEMAN, ARCHITECT, CHICAGO.
FOR DETAILS OF STEEL CONSTRUCTION SEE FIREPROOFING DEPARTMENT.

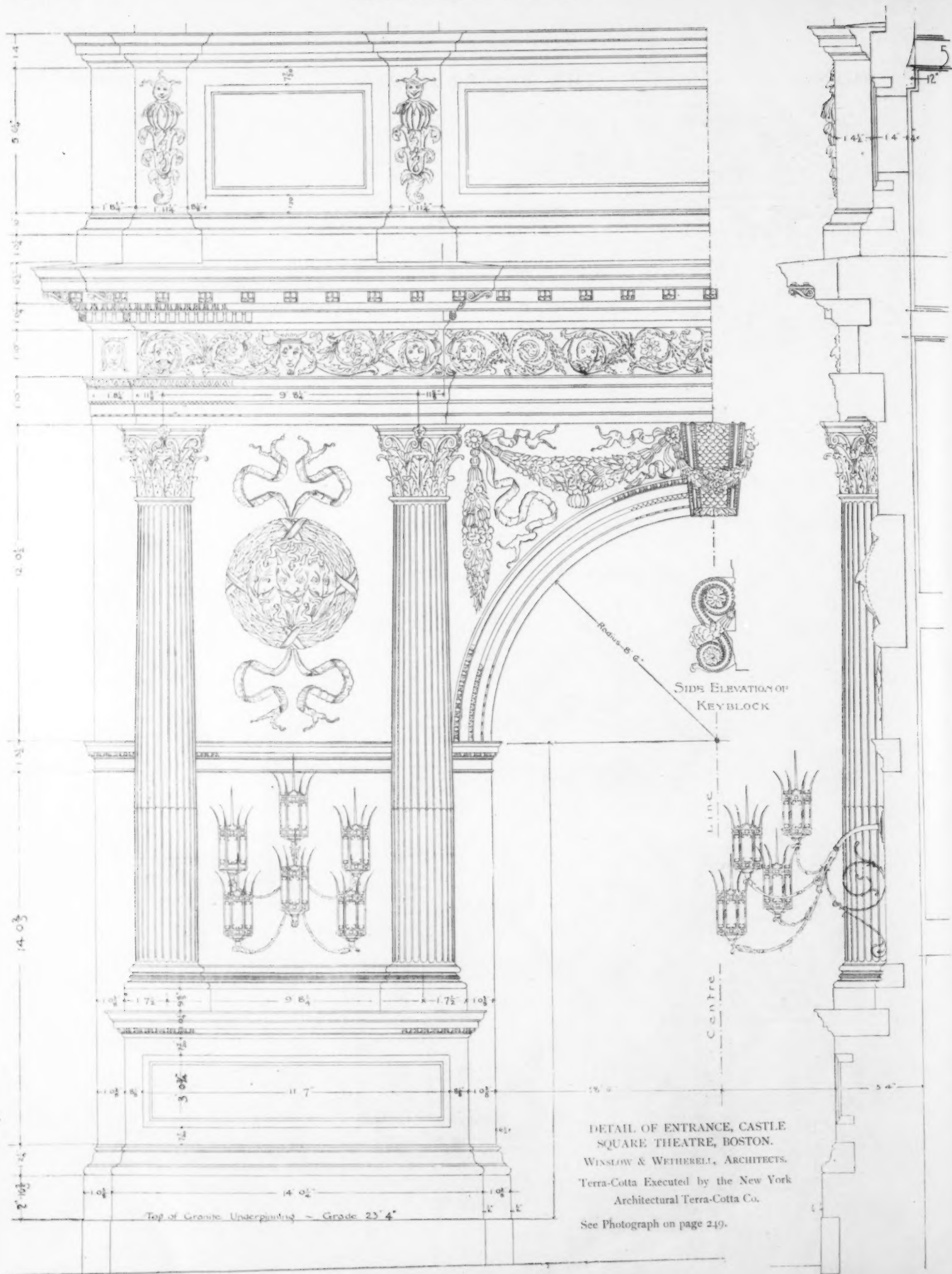




EXTERIOR DETAILS
HIGH SCHOOL BUILDING
AT
GREENFIELD, MASS.

Walter D. Perkins
Based on drawings
G. Brown & J. D. M. M.





HALF ELEVATION OF ARCH

SECTION ON LINE A. B.

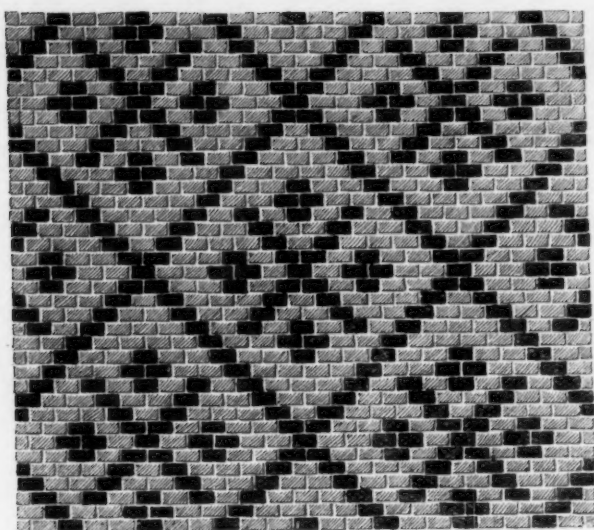


Fig. 24

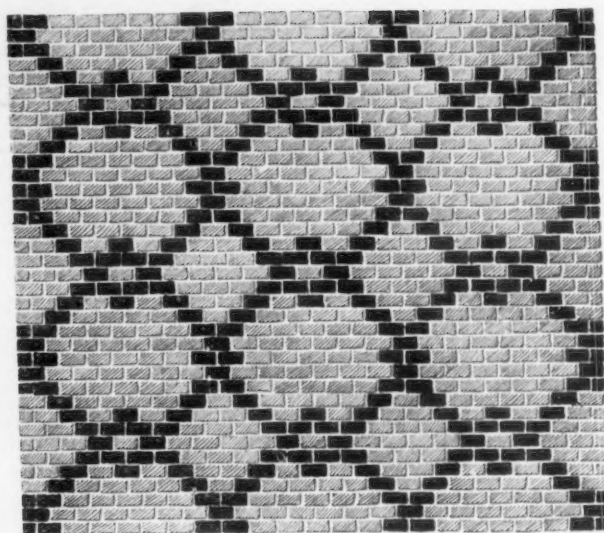


Fig. 25

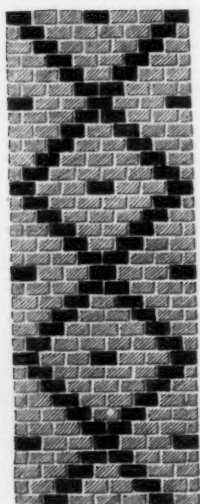


Fig. 26

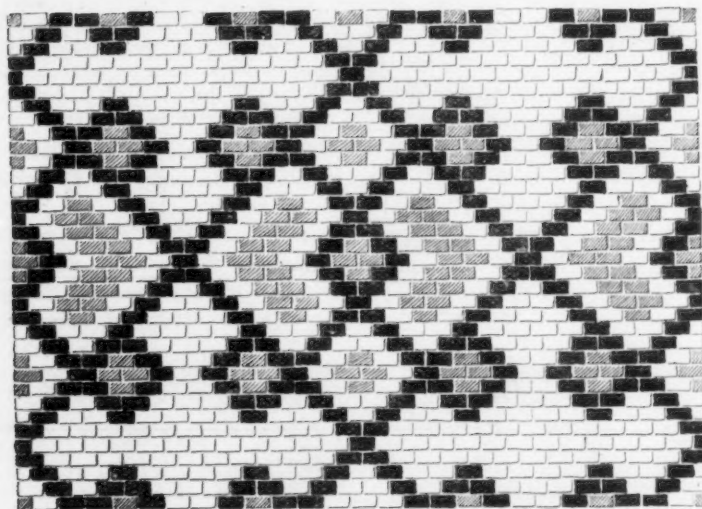


Fig. 27

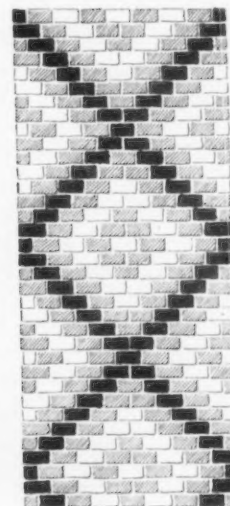


Fig. 28

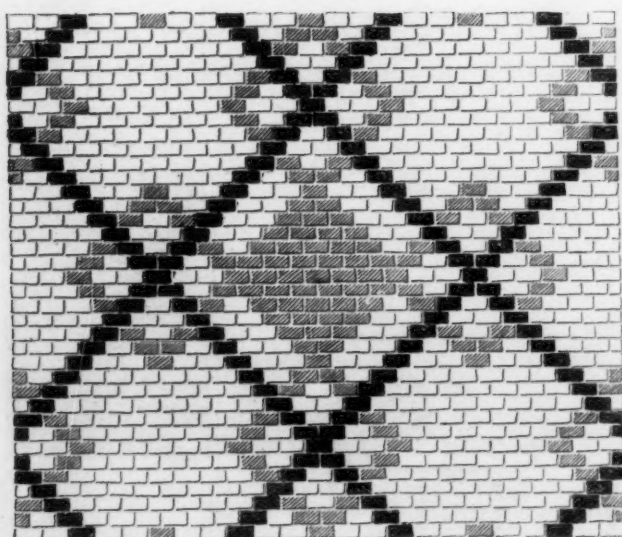


Fig. 29

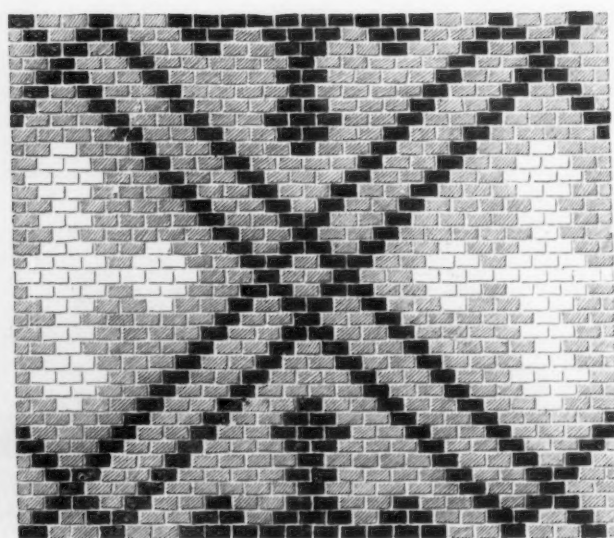
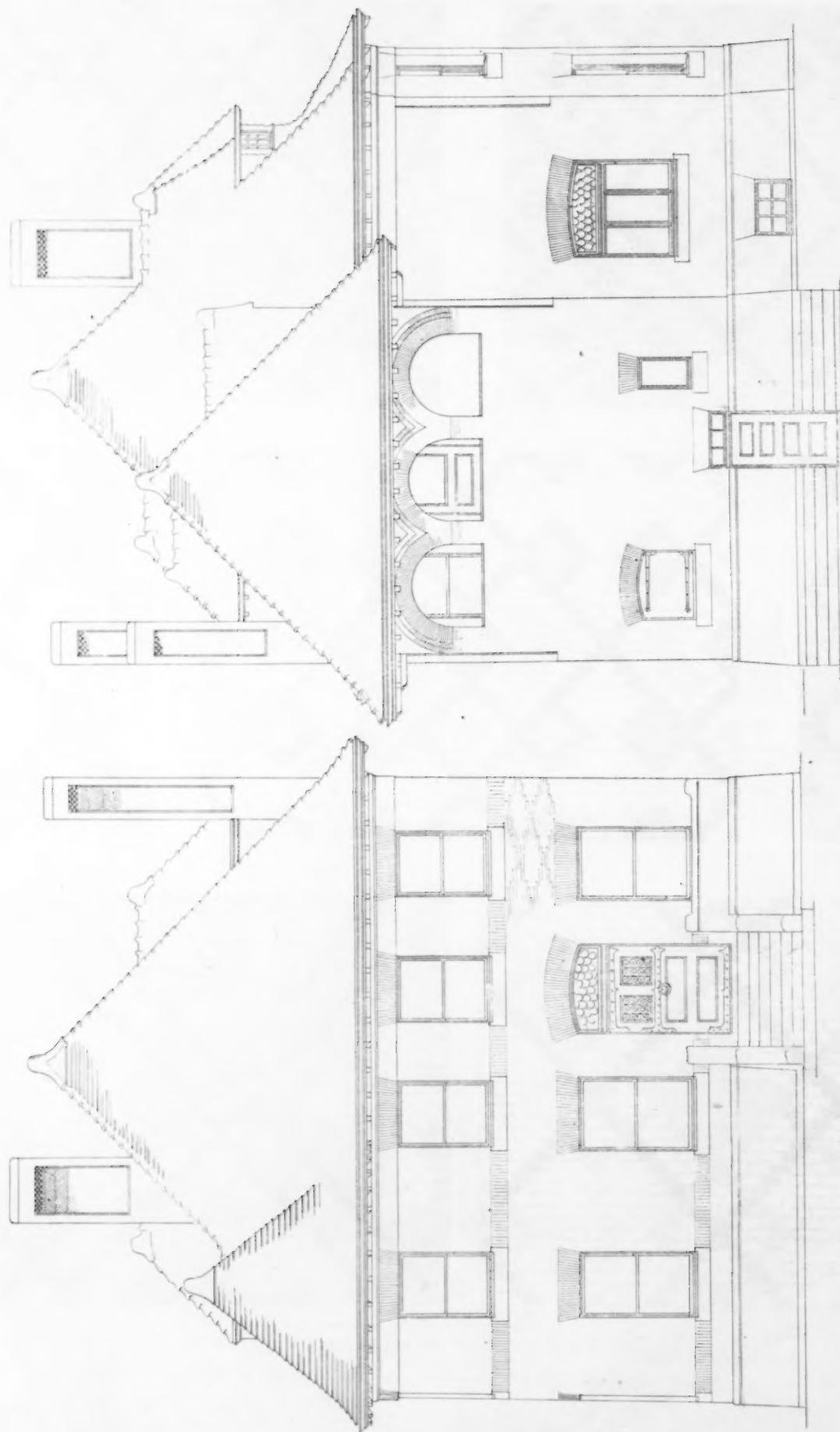


Fig. 30



FRONT AND REAR ELEVATIONS, AT ONE EIGHTH INCH SCALE, OF RESIDENCE AT ALLEGHENY, FOR J. C. PONTEFRACT, ESQ.
 MESSRS. LONGFELLOW, ALDEN & HARLOW, ARCHITECTS, BOSTON AND PITTSBURGH.
 See photograph on page 251 and plans on page 252.

THE BRICKBUILDER.

AN ILLUSTRATED MONTHLY DEVOTED TO THE ADVANCEMENT OF ARCHITECTURE IN MATERIALS OF CLAY.

PUBLISHED BY

The Brickbuilder Publishing Company,

CUSHING BUILDING, 85 WATER STREET, BOSTON.

P. O. BOX, 3282.

Subscription price, mailed flat to subscribers in the United States and Canada		\$2.50 per year
Single numbers		25 cents
To countries in the Postal Union		\$3.00 per year

COPYRIGHT, 1893, BY THE BRICKBUILDER PUBLISHING COMPANY.

Entered at the Boston, Mass., Post Office as Second Class Mail Matter, March 12, 1892.

THE BRICKBUILDER is for sale by all Newsdealers in the United States and Canada. Trade Supplied by the American News Co. and its branches.

PUBLISHERS' STATEMENT.

No person, firm, or corporation, interested directly or indirectly in the production or sale of building materials of any sort, has any connections, editorial or proprietary, with this publication.

WITH this issue of THE BRICKBUILDER, the third year of publication is completed. Those of our readers who have been with us from the start will, we think, pardon the pride we take in briefly passing over these years and pointing to the features which have chiefly contributed to the present success of the paper. While there have been changes in the ownership and business management, the editorial management has remained unchanged

The policy of THE BRICKBUILDER has always been to consider the interests of subscribers first and foremost. We have labored, and not without success, to furnish our readers with useful and interesting material in the field we cover. Looking back over the three volumes, increasing in size with each year, we find many original articles by the most prominent architectural writers, and drawings of much of the best current work in brick and terra-cotta. We have endeavored to follow a broad and liberal policy in the selection of material, but have never allowed the fear of losing a subscriber to stand in the way of rejecting drawings or articles which we considered lacking in merit and interest.

The first year we restricted the size of the paper to sixteen pages and covers, but we published a series of supplements in the shape of photographic reproductions of foreign architecture. Beginning with the second year, a change in the "dress" of the paper was made, which we think was an improvement, and with the March number of that year the present cover (designed by Mr. Harold Magonigle, the last Rotch Scholar) was adopted. The paper was somewhat enlarged and the amount of illustration in the text was considerably increased. The supplements were, however, discontinued, and it was only then that we discovered their popularity. So decided was the call for them from subscribers that some plan for systematically publishing photographs of foreign architecture was sought, and after due consideration it was decided to reprint George Edmund Street's well-known work on "Brick and Marble in the Middle Ages," using this as a vehicle for abundant supplementary illustration. How well this has been carried out our present readers can testify.

With the current year many important additions have been made, including the technical departments of *Fireproofing*, *Mortars and Concretes*, *The Mason Contractor*, and *The Manufacturer*. Each of these is developing into a substantial periodical by itself, and it has been our dream that in the course of one or two years the last half of the paper should be given up to these departments, each edited by a specialist, and forming so many complete periodicals, gathered under the covers of the parent publication. This year has also witnessed the first part of Mr. Dillon's careful and able translation of *L'Art de Batir chez les Romains*, by August Choisy, another out-of-print work. We have also inaugurated a series of letters describing the recent brickwork of the principal American cities, our staff of contributors numbering some of the best known architects in their respective localities.

There is now a word to be said concerning the future. It may not fall to the present editor's lot to guide the paper after this month, and promises regarding details cannot be made. In view of his retiring, however, he has made a special endeavor to provide a programme which should satisfy all present and prospective subscribers.

Of course, the regular features of the current year will be retained, and interest attaches in particular to the special features.

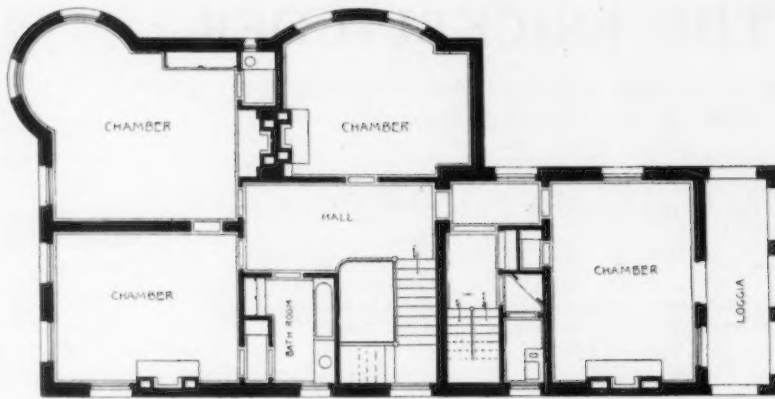


RESIDENCE FOR J. G. PONTEFRACI ESQ., ALLEGHENY, PA.
MESSRS. LONGFELLOW, ALDEN & HARLOW, ARCHITECTS.

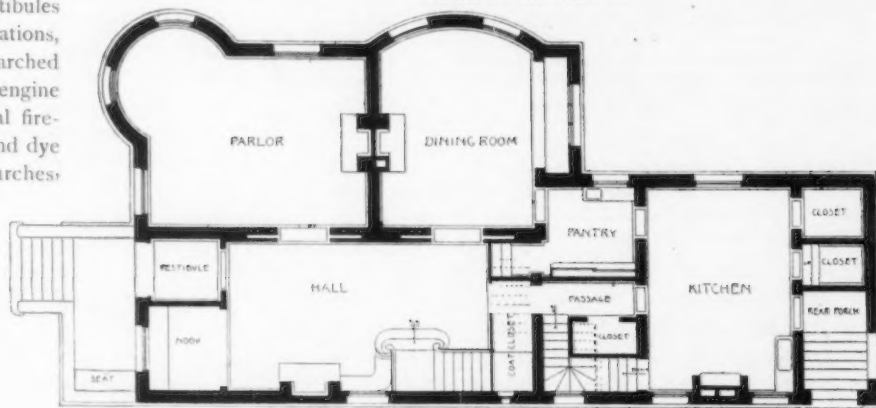
since the first issue, although Mr. Warren contributed largely to the editorials of the first year.

These will be found announced in detail, upon another page. Should you demand an apology for editorial shortcomings in the three years now closed, let us make it by presenting to you a list of writers whose work will more than make amends for our failures: Mr. C. Howard Walker, Prof. Allan Marquand, Mr. H. Langford Warren, Mr. R. Clipston Sturgis, Mr. Ralph Adams Cram, Mr. Bertram G. Goodhue, and Mr. Charles H. Alden, your special contributors for next year.

ENAMELLED brick are meeting with increasing favor in this country as a material of utility and beauty for building and other purposes, and new fields in which they can be used are constantly presenting themselves. They are especially adapted to elevator wells, vestibules and hallways, waiting-rooms of railroad stations, sanitariums of public and private buildings, arched ceilings, hospitals, libraries and colleges, engine and boiler rooms, restaurants, ornamental fireplaces, stables, chemical vats for mills and dye works, dark basements, bank vaults, churches, theatres, bowling alleys, swimming tanks, tunnels, kitchen brick ranges, and markets. Enamelled brick have won such favor in England that the municipality of London requires that all courts and alleys be built of this material. It reflects light, is fireproof, acquires no odor, is impervious to moisture, and forms a finished surface which is highly ornamental.



SECOND FLOOR PLAN



RESIDENCE OF J. G. PONTEFRACT, ESQ., ALLEGHENY, PA. SEE PLATE 94 AND PAGE 251.

RARITAN HOLLOW AND POROUS BRICK . . . Co. . .

Offices, 874 Broadway,
Corner 18th Street,
NEW YORK.

TELEPHONE 685-18TH.

FIRE-PROOF
BUILDING MATERIALS

VITRIFIED AND MOTTLED
FRONT BRICK

FIRE BRICK AND
REFRACTORY PRODUCTS

ENGLISH ENAMELLED
BRICK

Factories:

Keasbey's Landing, N. J.

Branches at

Boston, Philadelphia, Buffalo, Washington, Toronto.

FIREPROOFING.

A Department Conducted in the Interests of Building Construction to Prevent Loss by Fire.

FIREPROOF FLOOR ARCHES.

FOR some years the question of the strength of the various types of floor arches placed upon the market, the merits of the various forms in which we use fire-clay, the merits of the various kinds of material which have been proposed for use in connection with the subject, and comment upon the widely differing practice obtaining in Europe and America, have all formed a subject for discussion or argument. Tests of various kinds have been made and published, only to be picked to pieces by other parties interested; and all the time the keenest of trade rivalry has gone on, forcing the quality, price, and amount of material used down until it is sometimes a wonder that the stuff holds together long enough to get into the building. Various makers have claimed strength for their arches which no recorded tests bear out. Many of them publish tables of strength which, in the light of tests already made, appear to be either entirely at variance with good engineering practice, or absurd.

The whole subject is one which requires to be carefully gone over, so as to determine whether or not any saving can be effected in material, whether or not the amount of material used can be so distributed as to increase the strength of the floor, and so as to truly tell us what the safe strengths actually are.

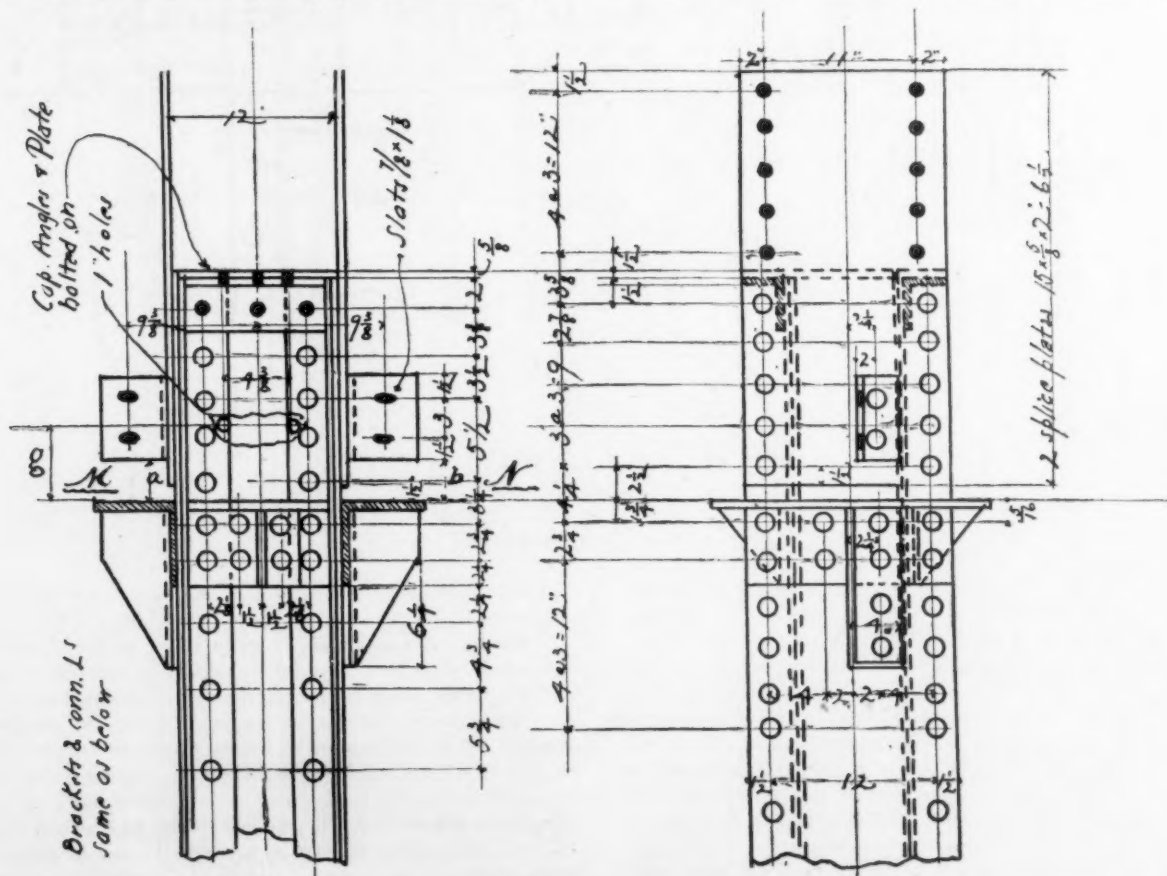
In order to aid in bringing some order out of this chaos, we have had a testing machine specially built by the Watson & Stillman Hydraulic Company, of New York, and have arranged with the various prominent makers of fireproof floor arches, and with those who desire to introduce new material, believing that they have something

which is superior to the ordinary types, to construct a series of arches, all of which have been, or will be, tested to destruction under carefully observed and recorded conditions. Quite a number of tests have already been made, and others are in progress, all indicating that certain very interesting results will be developed. It is our intention, in the succeeding numbers, to consider the following points:—

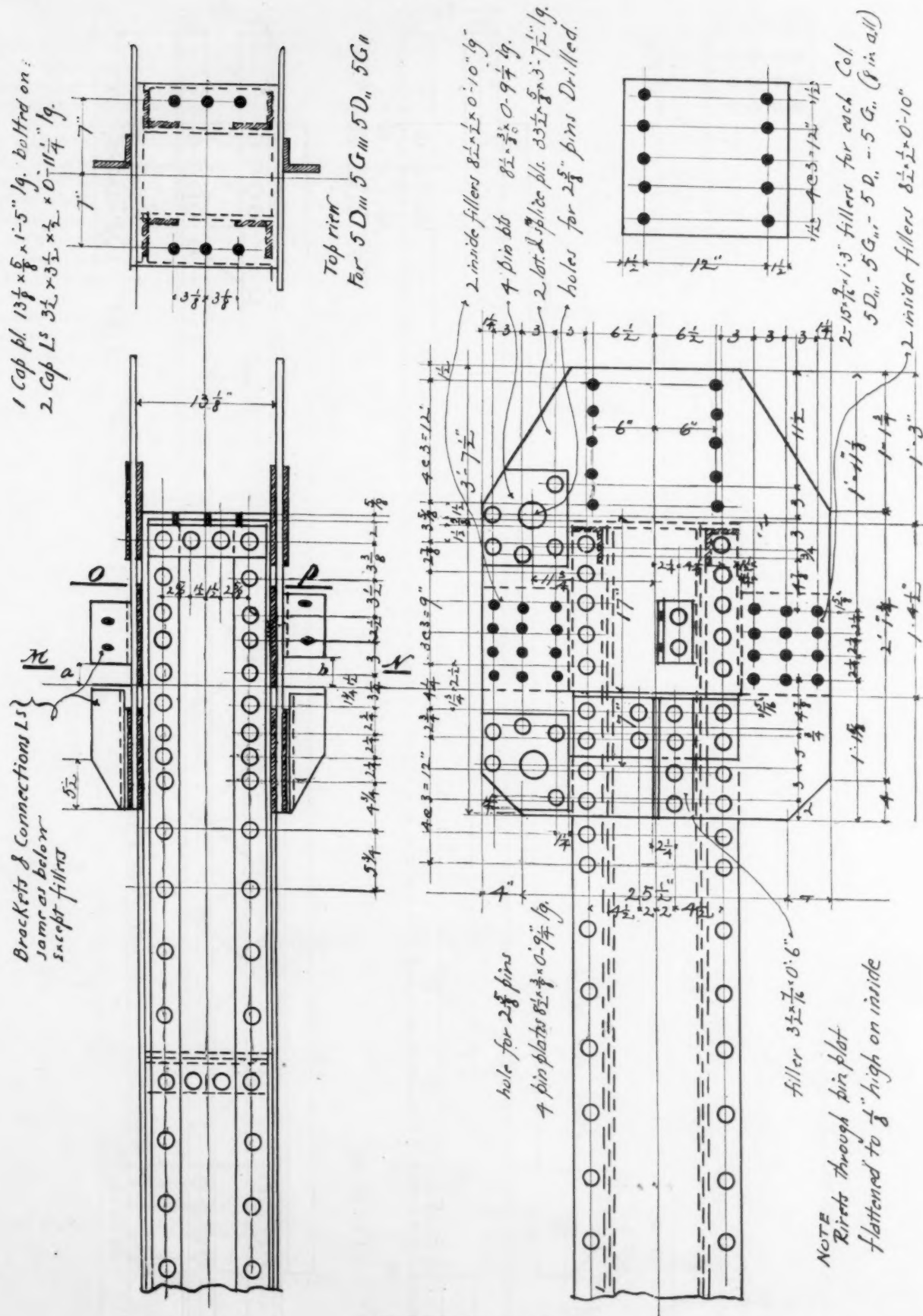
First. We shall give a brief summary of all of the published tests heretofore made, drawing certain general conclusions therefrom.

Second. We shall present details of all of the tests above outlined, and which we have made, recording everything which may be of interest in connection therewith, and illustrating them with numerous photographs, showing the method of fracture, the action of the arch during fracture, and giving graphic diagrams of the way in which the load was applied to the arches, and the way in which the arches acted under these loads.

Third. We shall then follow with a complete description of the testing machine and its method of calibration; fundamental formula applicable to the solution of the question of strength of the various forms of arch employed; the proper consideration of the proper factor of the safety to be used, and the meaning of the same; the effect on the arch of various forms of load application; the effect of the position of tie rods on the strength of the arch, and their proper spacing and location; the relative values of the various forms of skew-backs used in ordinary flat-arch construction and in segmental construction; the relative values of various kinds of mortars in the various forms of



THE PABST BUILDING, FIG. 1.



THE PABST BUILDING, FIG. 3.

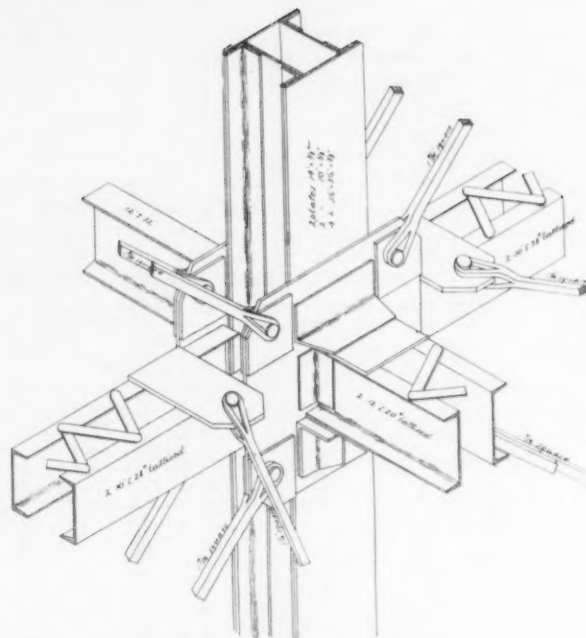
THE STEEL WORK IN THE PABST BUILDING.

THE evolution of the many-storied office building with skeleton steel construction from the few-storied building has taken place during the last seven or eight years. This evolution made many changes in construction to satisfy the increased loads and stresses; thus wooden columns were supplanted by cast-iron, and the latter were again displaced by riveted wrought-iron, and later by riveted steel columns. The changes followed in identically the same order as in bridge building. It was, therefore, quite natural that the empirical methods of the foundries and architectural iron works were supplanted by the exact methods of the bridge engineer. Not only are buildings carried to much greater height than formerly, but the proportion of height to least lateral dimension has increased very much. The stresses produced by the wind pressure must, therefore, be provided for.

The first building in which constructive details were designed to take care of the stresses induced by the wind was the Pabst office building, at Milwaukee. The steel work for this building was designed in May, 1891, and the erection completed June, 1892.

Up to the time that the Pabst Building was designed, column connections in high buildings subjected to wind stresses were made by four bolts passing through two horizontal flanges. This detail was used in a number of high buildings in Chicago, but in the Pabst Building the column connections consist of two longitudinal splice plates riveted to the tops of columns and connected to the bottoms of the next story of columns by field rivets, as shown in Fig. 1. These longitudinal plates were extended laterally to provide connections for the horizontal wind struts and the diagonal wind rods, as shown in Figs. 2 and 3.

The typical detail showing longitudinal splice plates with struts and rods attached is shown in Fig. 4, and the strut is shown in Fig. 5. Fig. 6 shows bracket of exterior or wall columns to carry brick piers; the bracket in this case is $12\frac{1}{2} \times 37$ inches. The details show the columns in two-story lengths.

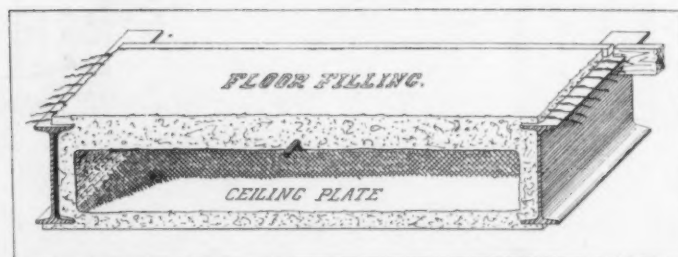


THE PABST BUILDING, FIG. 4.

Since the construction of the Pabst Building the longitudinal splice-plate connection for columns has been used by others in a number of buildings. Among other buildings we mention the Union Trust Building in St. Louis; the Young Men's Christian Association and Marquette buildings in Chicago; the American Surety Building, now building corner Pine and Broadway, New York. The longitudinal splice-plate connection makes a much stiffer joint than the old

METROPOLITAN FIRE-PROOFING Co.

PATENTED
SUSPENSION
SYSTEM.



For Floors, Roofs, Ceilings and all forms of Ornamental Cove Work.

FIREPROOF. LIGHT. STRONG.

SAVES METAL WORK.

REDUCES LOAD ON FOUNDATIONS.



Main Office, Trenton, N. J.

N. Y. Office, 874 Broadway.

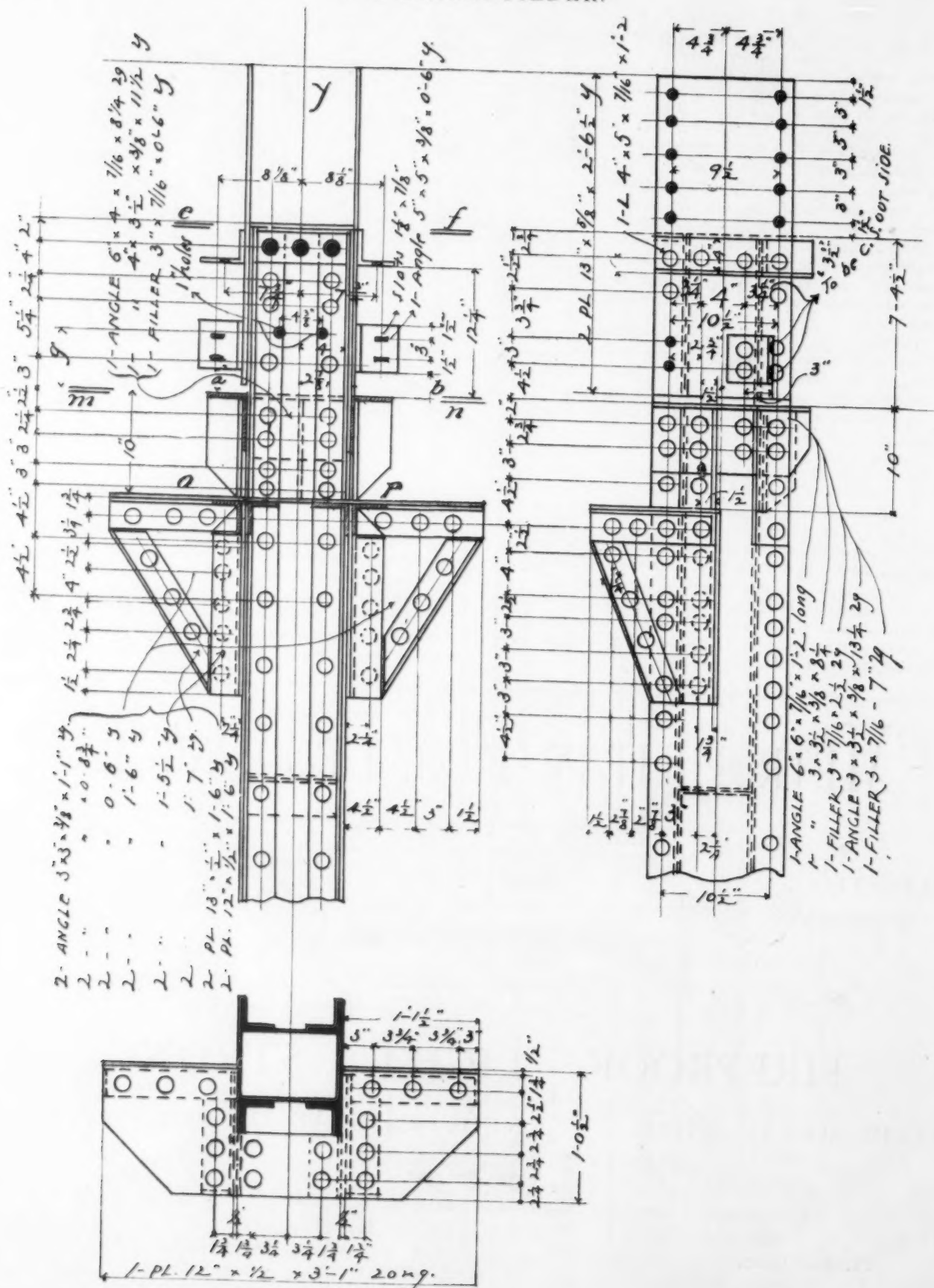
Boston Office, 166 Devonshire St.

Reference,

Cooper, Hewitt & Co.,

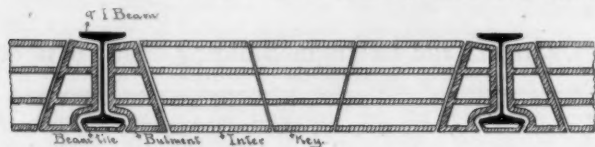
17 Burling Slip, New York.

CATALOGUES SENT ON APPLICATION.

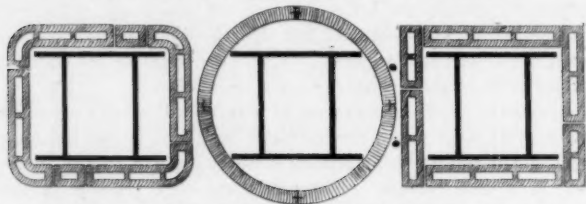


THE PABST BUILDING, FIG. 6.

connection, and easily permits making good details for the connection of the wind members. All of this is so clearly shown in the cuts as



SECTIONAL VIEW THROUGH CENTRE OF NINE-INCH ARCH TILE AS USED FOR FLOORS OF THE PABST BUILDING.



TWO-FOOT COLUMN COVERINGS IN THE PABST BUILDING.
PIONEER FIREPROOF CONSTRUCTION CO., CHICAGO.

to require no further description. Mr. S. S. Beman, of Chicago, was the architect of the building. The details herewith illustrated were designed by Mr. Albert H. Wolf, M. I. M. E., consulting and contracting engineer, Chicago, and the work was also erected by him.



A NEW PATENT FOR HOLLOW TILE FLOORS.
EDITOR OF THE BRICKBUILDER: NEW YORK, Oct. 23, 1894.
Sir, — I enclose a print of a design for floor construction, a patent for which was recently granted to the writer.

The present flat hollow tile floors, termed either "old style" or "end construction," have all bearing ribs horizontally which do not

admit of the determining of their dimensions according to the load they are designed for. This is proven, as no building law has any provision in this direction, and the use of the height of the section as well as the thickness of the tile webs is left entirely to the option of manufacturers and builders. We see used sometimes for the same purpose twelve-inch blocks with moment of resistance of sixty (section twenty-four square inch), ten-inch blocks moment of resistance one hundred (section sixty square inch), and finally six-inch blocks moment of resistance thirty (section four square inch), for one and the same load and purpose. The reason for this is because the parts which really are bearing are not distinct enough to be determined, and the line of resistance has no connection with the material itself. I have already shown by my own tests (in *Engineer's Record*, May 26) that strength attained by the common hollow tile floor is mainly derived from the use of strong cement mortar, making of the whole one monolithic piece; and this strength is even far larger than that one derived from the arch-like action, because the section devoted to it is far too small to carry anything. Thus as soon as the joint breaks a sudden collapse of the arch in smashing the haunches has been the outcome of most tests. The proposed design shows the material arranged in the line of resistance, while the lower part is merely a filling to get a flat ceiling. As soon as a sufficient amount of this new system can be manufactured a test to get at the merits will be made. I propose also to make a sand test, which is a test without any mortar at all, only a filling of the joints with sand. Using this test on all the systems in question, it will be shown how far they rely on the cohesion in the joints or not, and it corresponds to cases where joints are not carefully made.

I have termed the system "Austria," following the inscription of an Austrian emperor whose motto was represented by "A. E. I. O. U.," which means *Austria erit in orbi ultima*, or, freely translated from the Latin, "Austria will be the longest lasting empire in the world." This may be too much of a boast for an empire, but I consider it a good name for a fireproof floor construction.

Yours truly,

FR. VON EMPERGER.

EMPIRE FIREPROOFING COMPANY,

MANUFACTURERS AND CONTRACTORS FOR EVERY DESCRIPTION OF

..... Hollow Tiles and Porous Terra-Cotta

FOR FIREPROOFING BUILDINGS.

... ALSO, MANUFACTURERS AND DEALERS OF ... Salt-Glazed Terra-Cotta Wall Coping.

Manufacturers of HANSEN'S PATENT WEATHER PROTECTING CHIMNEY TOPPINGS.

Chimney Tops, Flue Linings, Sewer Pipe, Etc.

Contracts taken for the complete fireproofing of buildings in all parts of the United States. *Send for Illustrated Catalogue and Prices.*

TELEPHONE 553.

..... ESTIMATES FURNISHED ON APPLICATION.

Main Office, corner Wood and 5th Avenue, PITTSBURGH, PA.

::

::

::

Chicago Office, 1303 Monadnock Block.

MORTARS AND CONCRETES.

A Department devoted to Advanced Methods of using CEMENTS and LIMES in Building Construction.

AMERICAN CEMENTS.

II.

THERE are two distinct classes of rock cements in this country, although they are not distinguishable except by analysis.

The ordinary consumer will never note the difference, as the action of both classes is the same under like circumstances.

They are classified as double (bi) and triple (tri) silicates, and their compositions are known as

1. Silicate of lime and alumina.
2. Silicate of lime, magnesia, and alumina.

The combining proportions of these silicates differ materially, as the former requires a greater percentage of silica than does the latter.

During the year 1893 the production of American rock cements amounted to 7,411,815 barrels, and the proportions of the two classes were as follows:—

1. Bisilicates	2,495,268 barrels.
2. Trisilicates	4,916,547 "
Total	7,411,815 "

The percentages are approximately as follows:—

1. Bisilicates	33.67	} = 100
2. Trisilicates	66.33	

Although the terms "double" and "triple" silicates are used to distinguish the two classes, it is not intended that the rule is at all absolute.

On the contrary, it is wellnigh impossible to find a cement that can rightfully be classed as a double silicate that does not contain a small percentage of triple, and oftentimes a large percentage of single, silicates; therefore, the position of a cement in this classification is determined by the particular form of silicates which in its composition predominates.

As far as durability and general excellence are concerned, no distinction can be drawn between these two classes of cements. They have been produced in this country for many years, the

former since 1818, and the latter since 1824. The durability of either depends not as to whether it be a double or triple silicate, but rather upon the nearness with which it approaches true combining proportions. Whichever approximates this standard closest is, theoretically at least, the better cement; but, practically, it has been demonstrated by long-continued use that there may be an excess of the two bases, lime and magnesia, without detriment to the enduring qualities of the cements whether used in air or water.

A cement containing an excess of alumina will, when used below ground or in fresh water, remain stable and firm for an indefinite period, but is apt to disintegrate in masonry exposed to the atmosphere in a cold climate. Fortunately the rock cements of this country are not open to this objection, except to a very limited extent, as less than two per cent of the total output can fairly be so rated.

It is often stated by writers, especially those who advocate artificial or so-called Portland cements, that the rules governing chemically combining proportions must be strictly adhered to; that an excess of lime is not only objectionable, but positively dangerous.

If this be true, how are we to reconcile ourselves to its acceptance, while we have before us the unvarnished fact, that the natural rock hydraulic limes of France have been in use hundreds of years before Portland cement came into existence, and are in use to this day in vastly increasing quantities in sea water, in earth foundations, in masonry exposed to the atmosphere, in concrete blocks and arches, in monoliths, and in important works of every kind, and yet they contain not less than forty per cent of free lime?

Evidently there is a mistake somewhere, but rather than question unduly, hastily, or without apparent reason, the wisdom of so many of the eminent scientists who have persisted in this somewhat arbitrary view of the subject, we prefer to state such facts as are within the experience of those familiar with the use of cement, and at the same time, by quoting liberally from the works and statements of leading authorities, make clearly evident that the doctrine so maintained is without sound foundation. No cement, be it either natural rock or



NEW YORK AND ROSENDALE CEMENT CO.

MANUFACTURERS OF

"BROOKLYN BRIDGE" BRAND

ROSENDALE
HYDRAULIC CEMENT.

Warranted Superior
to any
Manufactured.

STRONGEST, DARKEST, BEST, ALWAYS FRESH.

USED ON

New York and Brooklyn Bridge. Washington Bridge, Harlem River.

Telephone, 190 Franklin.

WM. C. MORTON, Secretary.

A. J. SNYDER & SONS,

"CRESCENT" BRAND ROSENDALE CEMENT

Is a superior quality of Hydraulic Cement. Especially manufactured for important engineering work, such as Sewers, Reservoirs, Heavy Foundation, Masonry, Conduits, etc., requiring a high grade testing cement. Over 30,000 barrels of this cement have been used lately, on the new dams, for the Croton aqueduct. All this cement was subjected to the engineer's test, and not one barrel was rejected. We respectfully call the attention of Engineers and Architects, requiring a high grade cement to our "Crescent" brand. Samples furnished on application.

BERRY & FERGUSON,
37 to 45 Medford St., Charlestown,
Boston, Mass., Eastern Agents.

HENRY R. BRIGHAM, General Agent,
5 COENTIES SLIP, NEW YORK CITY.

Portland, contains ingredients in exact combining proportions. There is usually a slight variation. Some contain an excess of clay and others an excess of lime or magnesia. These variations are not so great, however, as to prevent prompt induration in air or water.

Much has been written by the advocates of artificial cements of the importance of subjecting cements to a high degree of heat in calcination in order to bring out their best qualities.

According to these writers, cements that cannot sustain a high heat without injury are of a low grade, and, singularly enough, these writers are unanimous in the opinion that all American rock cements are calcined at a low heat, and, therefore, as a matter of course, are, by them, classed as low-grade cements.

It may be stated, in passing, that this is an error on the part of these writers.

There are many American rock cements that stand high in public favor that are calcined to a white heat, the same as that to which Portlands are subjected.

We will defer the discussion of this particular branch of the subject to future papers, and confine ourselves to the elucidation of the various phases met with in a study of American rock cements.

A cement rock that produces the double silicates is a mechanical combination of two chemical compounds, viz., silicate of alumina (clay) and carbonate of lime, while that which produces the triple silicates is a mechanical combination of three chemical compounds, namely, silicate of alumina, carbonate of lime, and carbonate of magnesia.

The last two compounds named are combined in certain fixed proportions, while the clay is seldom so found, as the silica is usually in excess of true combining proportions with alumina.

These, with other compounds relative to the composition of hydraulic cements, will be found in the table of chemical combinations.

It does not follow that because a cement may contain ingredients the proportions of which are not in strict conformity to the law governing chemically combining proportions as ordinarily interpreted, it must necessarily contain an excess of one or more of the bases, for there may be, and often are, found triple, double, and single silicates in one and the same brand of cement; in fact, a cement is improved by diversifications of this character, as we will attempt to show in the course of these papers.

It may be taken as a truism that the essential constituents of a cement rock are carbonate of lime and silica. By calcination the carbonate of lime converts the silica into silicic acid.

Carbonate of magnesia acts in a similar manner to carbonate of lime, and when the two are present with a proportionate amount of silica, hydraulic energy, strength, and durability follow. And, as has been pointed out before, alumina, which is always present by reason of its combination with the only quality of silica obtainable, is not particularly objectionable unless it is in excess. It is not so good a base as lime or magnesia, and when in excess impairs the indurating value of the cement.

All cement rocks contain, in varying proportions, oxide of iron, soda, potash, etc., which are not objectionable if not in excess. The former gives color to a cement. One per cent will produce a yellowish cast, two per cent a drab, and four per cent produces a dark color. It has no effect whatever on the quality of a cement; it is simply an adulterant, and is usually in such limited amount as not to detract from, while it certainly does not add to, the value of a cement.

DYCKERHOFF PORTLAND CEMENT

Is superior to any other Portland Cement made. It is very finely ground, always uniform and reliable, and of such extraordinary strength, that it will permit the addition of 25 per cent more sand, etc., than other well-known Portland Cements, and produce the most durable work. It is unalterable in volume and not liable to crack.

8,000 barrels have been used in the foundations of the Bartholdi Statue of Liberty, and it has also been used in the construction of the Washington Monument at Washington.

Pamphlet with directions for its employment, testimonials and tests, sent on application.

HAM & CARTER,

560 ALBANY STREET, BOSTON.

E. THIELE,

78 WILLIAM STREET, NEW YORK,
Sole Agent United States.

ABERTHAW CONSTRUCTION COMPANY (Incorporated),

CONCRETE ENGINEERS

FIREPROOF FLOORS (Ransome System).

For Public Buildings, Hospitals, Schoolhouses, Office Buildings, Warehouses, Breweries, Stables, and Dwellings.
Contracts taken for all work in Portland Cement Concrete.

Foundations, Bridge Piers, Engine Beds, Retaining Walls, Pavements, Self-supporting Sidewalks and Sidewalk Lights (Ransome Patents).
Best Materials and Highest Skilled Workmanship.

12 PEARL STREET, BOSTON.

Union Akron Cement Company,

SOLE MANUFACTURERS
OF THE

The Strongest Natural Hydraulic Cement Manufactured
in America. In Successful Use for the
past Fifty Years.

CAPACITY OF WORKS 2,000 BARRELS DAILY.

Akron Cement,

(STAR BRAND.)

OFFICE, 141 ERIE ST.,

BUFFALO, N. Y.

THE UNITED STATES MORTAR SUPPLY CO.,
Machine-Made Lime Mortar for Bricklaying and Plastering,
Delivered in a Wet and Plastic Condition Ready for Use.

CAPACITY PER DAY:

MORTAR to Plaster 20,000 Square Yards, or to lay up
1,000,000 Bricks.

No. 289 FOURTH AVENUE, NEW YORK.

Telephone, 61-18th Street.

W. W. KENLY, General Manager.

F. W. SILKMAN, 231 Pearl Street,
NEW YORK.

IMPORTER AND DEALER IN

CHEMICALS, MINERALS, CLAYS and COLORS.

For Potters, Terra-Cotta and Enamelled Brick Manufacturers.

Correspondence invited.

The alkalis, soda and potash, when present to the extent of three to five per cent, add much to the quality of a cement, as they have much to do as an aid to the caustic bases, lime and magnesia, in the conversion or reaction of silicate of alumina into silicic acid and alumina, or forming a silicate that is soluble in acids.

But the constituents, silicic acid, lime, magnesia, and alumina, being the essential ingredients in the formation of hydraulic cements, the non-essentials named will, for the sake of brevity and space, be omitted in our calculations.

CHEMICAL COMBINATIONS.

1. Oxygen	28.57	}	= Ca O.	Lime.
Calcium	71.43			
2. Oxygen	40.04	}	= MgO.	Magnesia.
Magnesium	59.96			
3. Oxygen	53.27	}	= Si O ₂ .	Silica.
Silicon	46.73			
4. Oxygen	47.00	}	= Al ₂ O ₃ .	Alumina.
Aluminum	53.00			
5. Carbonic Acid	52.40	}	= Mg CO ₃ .	Carbonate of magnesia.
Magnesia	47.60			
6. Carbonic Acid	44.00	}	= Ca CO ₃ .	Carbonate of lime.
Lime	56.00			
7. Silica	54.68	}	= Al ₂ Si O ₅ .	Silicate of alumina.
Alumina	45.32			
8. Silica	34.91	}	= CaO, SiO ₂ .	Silicate of lime.
Lime	65.09			
9. Silica	42.91	}	= MgO, SiO ₂ .	Silicate of magnesia.
Magnesia	57.09			

10. Silica	26.92	}	= 100 Bisilicate of lime and alumina.
Lime	50.20		
Alumina	22.88		
11. Silica	38.50	}	= 100 Bisilicate of lime and magnesia.
Lime	35.89		
Magnesia	25.61		
12. Silica	29.01	}	= 100 Trisilicate of lime, magnesia, and alumina.
Lime	27.04		
Magnesia	19.29		
Alumina	24.66		

With the aid of the foregoing table, and the analyses of the various cements of this and other countries, which will be given later, it will not be a difficult matter to deduce conclusions which, it is hoped, may be of interest to the reader.

URIAH CUMMINGS.

It is ridiculous to suppose that with the purest chalk and the purest clay the English possess, they cannot make better cement than the Germans, who have none such. In THE BRICKBUILDER, a journal published in Boston, articles on cements and cement tests have recently appeared, in which two classifications of cement were made:—

1st, German cements as of first quality.

2nd, English cements, generally bracketed with Belgian cements, as of second quality.

This is a serious matter for the commerce of this country, and is well entitled to the attention of engineers, who should show how thoroughly unfounded is such a supposition."—*Fairplay* (London).

Mannheimer Portland Cement.

UNEXCELLED IN QUALITY.



"The results of tests with standard quartz are far above the average of most cements."

CLIFFORD RICHARDSON,
Inspector of Asphalt and Cements,
Engineer Dept., Washington, D. C.

"This brand of Portland Cement was found especially qualified for the purpose of concrete casting on account of its perfect uniformity, intensive fineness, progressive induration after the first setting, and of its great tensile and crushing strength."

Vide Report of CARL A. TRIK,

Superintendent of Bridges, Philadelphia,
On Concrete Arch Highway Bridge over Pennypack Creek.

MORRIS EBERT,

IMPORTER AND SOLE AGENT FOR UNITED STATES, CANADA AND CUBA.

NEW YORK OFFICE,
Postal Telegraph Building, 253 Broadway.

GENERAL OFFICE,
302 Walnut Street, PHILADELPHIA.

ESTABLISHED 1858.

WILLIAM N. BEACH, President.

LAWRENCEVILLE CEMENT CO.,

MANUFACTURERS OF

BEACH'S ROSENDALE HYDRAULIC CEMENT.

Guaranteed to stand all required tests.

115 Broadway, NEW YORK.



"Burham"

ENGLISH PORTLAND CEMENT celebrated for Reliability, Chemical Purity, Great Strength, High Sand Carrying Capacity and General Uniformity. Quantity imported yearly far greater than any other brand.

For Sale
by

Berry & Ferguson, 36 to 45 Medford St.,
Charlestown District, BOSTON, MASS.



"Lafarge"

French Portland Cement, the only material to use for setting, pointing, and backing LIMESTONE and GRANITE.

Will not stain and makes the strongest binder.

James Brand, Importer, 81, 83 Fulton St., NEW YORK.
34 Clark St., CHICAGO.

CONCRETES, CEMENTS, AND MORTARS: OLD AND NEW.

THE "White City" of antiquity was Rome, and most of the so-called marble houses of the Augustinian period were not such in reality, but owed their stone-like appearance to the plasterer's art, which at that time had reached a high state of perfection, and gave to stone the appearance and induration of the finest marble.

It is on record that some of this plastering, which in some particulars resembled the white "staff" used on the World's Fair buildings, lasted for centuries, but the art which enabled man to make and apply this material was lost before the examples perished.

It is evident the ancients, at all events the Egyptians, Greeks, and Romans, possessed a knowledge of eminent mortars and cements, as is proven by the phenomenal strength and durability of the remains of edifices still standing to receive their tribute of admiration. Doubtless much was due to the durability of the stone used, but builders of to-day know that more was due to the superiority of the mortar employed. True, the action of time has fostered improvement and aided petrification, but had the mortar been composed of inferior materials, or manipulated unskillfully, it would have been rotten

centuries ago, and the stones it held together would have been lost to us forever.

In all highly civilized communities good mortar was and is a necessity. Indeed, the quantity of mortar used in any community may almost be accepted as an index of its civilization.

The city of Nineveh has left us comparatively nothing of its history, as it was a city of mud and unburnt clay, adobe walls, and loamy mortar. Of Babylon we know more, as it was a burnt-brick built city, with walls bonded together with bituminous mortars. Egypt, that cradle of the arts, built the massive pyramid of Sackkara of bricks cemented with Nile silt! later, she raised her temples and pyramids of hard syenite, and held them together with imperishable asphaltic mortars; but the greater works of this wonderful people were held together with a mortar formed by an admixture of hydrate of lime and Nile silt. The Greeks, in their earlier public buildings, dispensed with mortar to some extent, and used dowels or pins made of cypress wood to hold the stones in place. All their joints, however, were rubbed or ground together, so that the junction of the stones was almost perfect; later on, mortar was used in many of their structures. The Romans, the most practical builders of antiquity, sur-

The Cummings Cement Co.

200 Main Street, Buffalo, N. Y.

Works at Akron, N. Y.

Capacity, 2,000 Bbls. Daily.

SPECIAL BRANDS:

"OBELISK" and "U. S. G."

MANUFACTURERS OF

AKRON

CEMENT.

"AMERICAN SEAL."

Mortar Stains.

These are in four standard colors, RED, BROWN, BLACK and BUFF, furnished either in pulp or dry. They are made from such pigments only as I have found best adapted for the purpose. They are strong and durable and can be relied upon in every case. They mix easily with Lime or Cement. Special colors made to order.

— AND —

Elastic Oil Cement.

This is made expressly for laying or embedding Slate and Tile Roofs, repairing leaks around Chimneys, Dormer Windows, Skylights, Scuttles and Fire Walls; it is waterproof and will not crack. Made in three colors, Red, Brown and Black.

WILLIAM CONNORS, Manufacturer, Troy, N. Y.

W. H. GATES, Agent, 30 Kilby Street,

BOSTON, MASS.

passed all peoples, ancient or modern, in their knowledge of the materials they made use of in their building operations, and it is to their intelligent attention to mortar making that we moderns are enabled to see the work of their hands. The importance of the manufacture of mortar was such that in all large works, national, municipal, or private, it was deemed necessary to employ supervising officers, called Ediles, whose duties were to inspect materials and superintend the manipulation of all mortars and cements used in the building.

We may glean some idea of the labor expended in the making of mortar from Vitruvius, who says: "That men mixed the ingredients by beating them with staves until the whole mass was smooth and plastic."

In another place the same author says: "The builders mixed puzzolana with lime to give it (the mortar) greater strength, and piers built in the sea would be as strong as if built on land, as the mortars made this way would harden just as well in the water as on the land."

It is quite evident also that the Phœnicians were aware of the qualities of puzzolana, for some of the docks and wharves of Carthage were built of stone and cemented together with a mixture of lime and puzzolana. It is difficult at this date to trace to its source the invention of lime-mortar, but it is due either to Egyptian or Phœniciana ingenuity, and was a grand stride in the direction of civilization and culture, and it is curious to think that for several thousand years no further progress in its manufacture was made. Indeed, until about the commencement of the present century, common lime-mortars were made in the same manner that was adopted four thousand years ago.

In the matter of producing a water-resisting mortar, much more skill and knowledge were required; yet we find that the possession of this knowledge by the ancients antedates the Christian era by several centuries, as the use of puzzolana mixed with lime to form a cement was known to both Phœnicians and Romans long before Vitruvius flourished.

The discovery of the manufacture of a mortar that would set and harden under water was another step forward in human culture, and evinced a knowledge of chemical conditions by the early builders that is really amazing. Hydraulic lime and the modern product of cement were unknown to them, but they seemed equal to the occasion, for they found that a proper admixture of lime, puzzolana, and pounded bricks formed a cement that answered well their purposes.

It is not known at what period the fact was discovered that certain limestones would yield a lime or cement capable of hardening under water. The French writer, Vicat, in the beginning of the present century, was the first to make an extended investigation of the laws governing the action of limes. Up to the middle of the eighteenth century puzzolana imported from Italy and France, and from Germany via Holland, was the standard ingredients for hydraulic mortars in England.

In 1756, John Smeaton, C. E., was intrusted to build a new lighthouse on the site of the Eddystone, which had recently been destroyed by fire, and he set to work to discover some material at home which would resist the action of both surf and sea. The lime from Abertaw answered his purpose. He investigated the cause, and proved before long that only those limes resist water which, when treated with acids, leave argillaceous residues. The spell was broken, and

MANHATTAN CEMENT COMPANY,

21 TO 24 STATE STREET,

NEW YORK.

IMPORTERS OF

"GERMANIA" (German Portland Cement).

Positively the best sidewalk cement made.

This statement is based upon reports from consumers throughout the country.

Germania was selected in preference to all others for use in laying the walks in front of the White House, at Washington, on account of its almost perfect color and great durability.

FOR CONCRETE FOUNDATIONS IT HAS NO SUPERIOR.

Pamphlets giving directions regarding mixture of sand for all kinds of work sent on application.

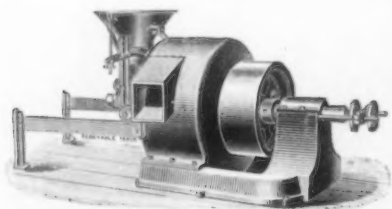
"GLOBE" (Belgian Portland Cement).

Tested by N. O. Olson, Engineer of Fairbank's Testing Dept., with the following results: Average tensile strength of five briquettes Neat Cement, seven days, **462 pounds per square inch.** Average tensile strength of five briquettes, one part Cement, two parts Sand, **172 pounds per square inch.**

The Globe Portland Cement has been furnished to the following contracts:—

Broadway Cable Road, New York City	40,000 bbls.
Foundation Terminal Warehouse, New York City	15,000 bbls.
Foundation Power House, Brooklyn City R. R.	15,000 bbls.
Baltimore Cable Road	10,000 bbls.

BERRY & FERGUSON, Agents for New England, 37 Medford St., (Charlestown District,) BOSTON, MASS.



Sturtevant Rock Emery Mills

- - AND PATENT - -

ROCK EMERY MILLSTONES.



FIT ANY MILL FRAME.

Fastest fine grinder known.

Sturtevant Patent Vertical Mill has no rival for reducing **Plaster, Paints, Chemicals, Carbons, Talc, Soapstone, Slate, Barytes** and like materials. 30" Mill Costing but \$400, grinds to fine powder from 1 to 4 tons per hour. No foundations, no screens, no noise, no dust. Remember that for \$400 you have a machine that is **ready to run** and that will keep **running** longer without repairs than any other fine grinder. Send for special circular.

Made of **Blocks of Rock Emery set in Metal**, making the hardest and most cutting millstone ever built, and not expensive.

A Customer Writes:

SELLERSBURG, IND., June 25, 1894.

We can grind from 70 to 75 bbls. Louisville Cement per hour with your Rock Emery Stones. This is from 10 to 15 bbls. more per hour than our ordinary stones will grind. Since May 3 have dressed these but twice. Ordinary Stones we dress every three days. Rock Emery Stones save us several dollars per week in dressing alone.

CLARK COUNTY C. CO.

RAPID—because Rock Emery has no equal for cutting qualities. **ECONOMICAL**—because Rock Emery is the most durable grinding surface known. **NO EXPERIMENT**—because many large manufacturers in your own line already use and indorse them, and hundreds in use for other purposes.

SEND FOR CIRCULARS AND REFERENCES.

STURTEVANT MILL COMPANY, 70 KILBY ST., BOSTON.

artificial cements followed each other rapidly after that. Parker took out his patent for Parker's cement in 1796. This consisted of lumps of chalky clay gathered from the seacoast. It became known as "Roman cement," because of its being similar in color to the Roman puzzolana. In its action it was somewhat like to our Rosendale. By inference, it followed that hydraulic cements could be produced artificially of lime and clay.

Parker made a number of experiments with clinkers, pulverized limestones, and the calcareous detritus produced by the wear of limestone roads near Leeds, mixed clay with it, and burned it in a kiln at a red heat. He called the resultant "Portland cement," because it was similar in color to Portland stone. The name thus given has clung to this cement ever since, no matter where made.

In 1827 Sir Charles Paisley improved and cheapened the process of manufacture, by selecting English chalk as being best suited to the purpose, owing to its uncrystalline, fine-grained quality. He mixed it with clay from the deposits at the mouth of the Medway, near Chatham, and calcined them. This made a good cement, but as the merits of white-heat calcination were then not known the quality could not be relied upon.

The credit is due to a German, Dr. Fuch, of Munich, of first formulating a scientific theory concerning the manufacture of cement, and stripping it of its mystery. He proved in a prize essay that Portland cement could be made anywhere and from a variety of materials,

abundant in every locality. This essay, being translated in several tongues, was the means of raising a host of manufacturers, with the result of bringing disgrace on the manufactured article, as it lacked uniformity of quality, and could not be relied upon, and architects and engineers avoided its use and stuck to old methods.

In 1858 John Grant, a London engineer, made a number of experiments, and so far succeeded in improving the quality that he completed the Thames embankment and the London drainage works without an accident, so far as the cement was concerned. The experiments made by Grant led him to believe that the heaviest cement was the best, and his reputation, which was high, had the effect of spreading abroad the impression that to have weight was of more importance than to be finely ground.

This idea did much harm, even after it had been proven beyond a peradventure that it was fineness, and not weight, that gave to the cement its superior tensile strength. Through the efforts of Reid, Brund, Mann, Newman, and others in England, M. Noel, MM. Chatony and Rivot, and others in France; Dyckerhoff, Michaelis, and Bauschinger in Germany; of Zuirek and Hanenschild in Austria; Gen. Gilmore, W. W. Maclay, Elliot C. Clarke, E. J. Desmith, and F. Kidder, of the United States, the truth has been established that, the materials being good, it is fineness that imparts to the material its good quality. W. W. Maclay, engineer of the New York docks, made between seven thousand and eight thousand tests, to satisfy him-

ATLAS PORTLAND CEMENT.

WARRANTED EQUAL TO ANY AND SUPERIOR TO MOST OF THE FOREIGN BRANDS.

OFFICIAL TESTS, Nos. 3567 and 3568, made by the DEPARTMENT OF DOCKS, New York, March 31, 1894, being part of contract No. 464 for 8,000 barrels.

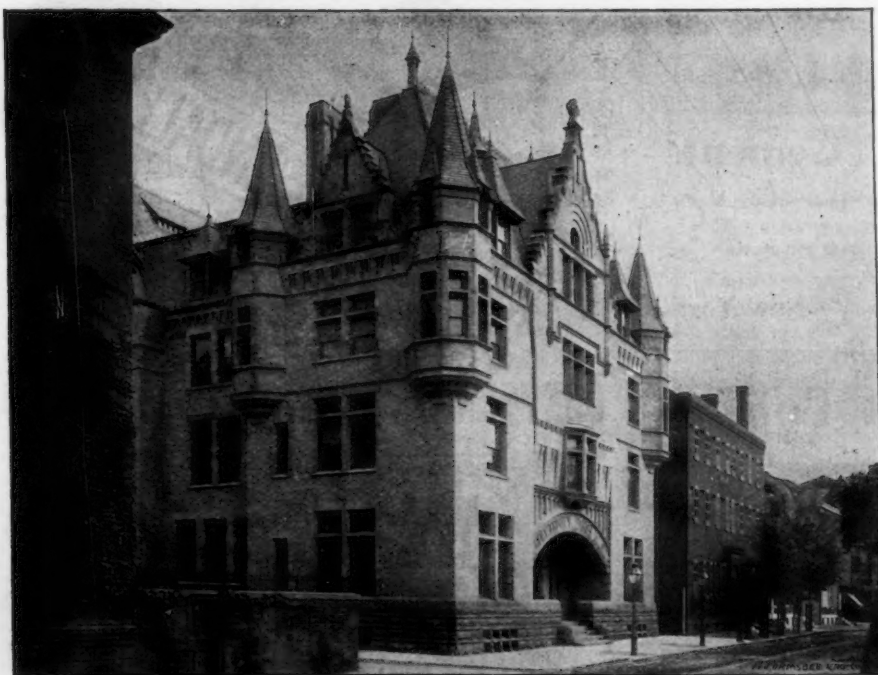
TENSILE STRENGTH, 7 days, neat cement 622 lbs.

" " 7 days, 3 parts sand to 1 of cement 332 lbs.

Parts steamed and boiled Satisfactory.

All our product is of the first quality, and is the only American Portland Cement that meets the requirements of the U. S. Government and the New York Department of Docks. We make no second grade or so-called improved cement.

ATLAS CEMENT COMPANY, 143 LIBERTY STREET, NEW YORK CITY.



Holy Trinity Parish House,

PHILADELPHIA.

♦♦

Buff and Pompeian Brick Laid
in Clinton Hematite Red.

♦♦

Messrs. Hewitt & Bro., Architects,
PHILADELPHIA.

♦♦

Messrs. Dorsey & Smith, Builders,
PHILADELPHIA.

♦♦

ILLUSTRATION FROM . . .

"A Little Talk on Metallic Paints and Mortar Colors."

Write for this book, mailed free on application
to the Publishers,

THE

CLINTON METALLIC PAINT CO.,

OF CLINTON, N. Y.

MANUFACTURERS OF . . .

High Grade Mortar Colors and Metallic Paints.

Eastern New England Agents:

FISKE, HOMES & CO., 164 Devonshire Street, - - - - BOSTON.

self as to what constituted the best cement, and in every case he found — where materials were chemically equal — that the finer grades were the best adapted for work requiring strength. Mr. E. C. Clarke, of the Boston Maine Drainage Works, made some twenty-five thousand tests with a like result.

Mr. Kidder, who watched a number of tests made at the School of Technology, Boston, arrived at the same conclusion. It may therefore be laid down as an axiom, that, no matter how good the material may be, if it is not ground to a fine texture, it cannot be relied upon. Brands possessing a uniformity of texture will give better results than an admixture of brands, and when once a brand has been found to do all that was claimed for it, and it fills the bill, it is best to stick to that particular brand. A good cement, when properly set, should equal in strength good building stone, and should have a like or greater specific gravity.

At this writing, there are quite a number of brands of Portland cement in the market, many of them being imported from England, Germany, France, and Belgium. Some brands are exceedingly good, while a number of them are inferior to many made in this country. Indeed, some of the Portlands made in Pennsylvania, New Jersey, and other States are as good and reliable as some of the imported high grades, though I am free to confess that but few of our own brands grade as uniformly as the Dyckerhoff or Boulogne makes. Doubtless the quality of uniformity of the two brands named is due to the care and perfection of manufacture, for neither France nor Germany possess raw material in as good a quality as is found in many places in this country.

The English Portland is a mixture of clay, consisting chiefly of silica and alumina and chalk, or nearly pure carbonate of lime. The clay and chalk are ground roughly, and mixed in the proportion of one to three by weight, then again ground under water. The mixture is then allowed to settle and the water to drain off, and the mass is then dried and made into cubes, bricks, or balls, two or three inches in diameter, which are placed in a kiln and heated to a white heat. They are then allowed to cool, and afterwards reduced to an impalpable powder. Unlike natural cements, Portland does not deteriorate when exposed to dry air. Dr. Michaelis, a noted expert on cements, says that the raw materials, when dried at 212° F., consist essentially of seventy-five to seventy-nine per centum, by weight, of

carbonate of lime, and twenty-four to twenty per centum of silicate of alumina, clay. These when burned represent sixty-two and one half to sixty-seven per cent of lime, and thirty-three and one half to twenty-nine per cent of silicates, silica, alumina, oxide of iron, leaving four per cent for carbonate of magnesia and accessories. After the hardening of the hydratal cement, a transformation, by compressive reaction, has taken place into hydrates, silicate of lime as the most important ingredient, in hydrated aluminate of lime, ferruginous lime, hydrate of lime, basic sulphate of lime, and carbonate of lime."

The results of analyses by other investigators by microscope and chemical tests verify the conclusions arrived at by Dr. Michaelis. A preponderance of alumina favors quick setting, while an increase of iron has an opposite effect. The partial vitrification obtained in the burning causes the particles forming the whole to lose their globular character and become laminated or flattened. This feature reduces the bulk and increases the value of the cement, inasmuch as the laminated texture achieves more intimate contact by surface.

The English standard requires these tests, viz., that the cement shall weigh one hundred and ten pounds to the strict Imperial bushel; that it shall pass through a sieve having from one thousand six hundred to three thousand meshes per square inch, and that its tensile strength shall be two hundred pounds per square inch at the end of seven days, the first passed in damp air, and the rest under water. American engineers exact a somewhat higher standard, some specifications calling for a tensile strength of two hundred and fifty pounds to the square inch.

FRED T. HODGSON, C. E.

(To be continued.)

ENGLISH manufacturers of Portland Cement have had a meeting to endeavor to form an association which will prevent adulteration of cement. We have just received the stenographer's report, which will be published in part in our next issue.

Alsen's Portland Cement.

The strongest, finest ground, and most uniform Cement in the world. Permits the admixture of more sand than any other, and is the best for mortar or stuccoing.

143 Liberty Street, - - New York.

Peerless Mortar Colors,

RED, BLACK, BROWN, AND BUFF.

Our New Colors are novel and attractive and well worthy of attention.
MOSS GREEN, ROYAL PURPLE, POMPEIIAN BUFF, FRENCH GRAY, COLONIAL DRAB.

All Colors Permanent and Superior to any Article in Use.

SAMUEL H. FRENCH & CO.,

Painters' and Builders' Supplies.

ESTABLISHED 1844.

PHILADELPHIA, PA.

SEND FOR CIRCULAR AND CATALOGUE.



CLEVELAND IRON ORE PAINT CO.



MANUFACTURERS OF
HIGH GRADE

MORTAR

COLORS.

ALSO,

Metallic and Graphite
Paints,

IN ALL FORMS.

SEND FOR CIRCULAR AND
PRICE LIST No. 34.

Cleveland, O.

THE MASON CONTRACTOR.

A Department conducted in the interests of the Builder, and the Contractor for Brickwork.



UNION HILL SCHOOL, WORCESTER, MASS

EARLE & FISHER, ARCHITECTS.

THE UNION HILL SCHOOL, WORCESTER.

THE side elevation, detail of entrance and first floor plan of this school were published last month. It was built by Henry Mellen & Son, contractors, for \$14,000, exclusive of heating and ventilation, which cost \$1,350, and the school furniture, which cost \$572. The following data as to specifications are of interest: —

Entrance steps and damp course, New Hampshire granite.

Water table and sills, Indiana limestone, drove tooled.

Name tablet, "Verde Antique" Champlain marble, V cut letters, gilded.

Brick (common), best Brookfield, laid Flemish bond, with black headers between damp course and water table.

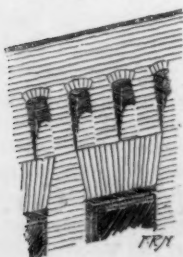
Ornamental brick, Philadelphia & Boston Face Brick Co., all flat arch brick ground, hollow brick used for inside course of exterior walls.

Concrete floor in basement.

Timber and inside finish, Georgia pine.

Roof, tar and gravel.

Galvanized iron cornice.



Blackboards, 3-8 inch thick, 3 feet 6 inches high, Slatington (Pa.) slate.

Architects: Earle & Fisher, Worcester, Mass.

THE accompanying sketch shows a very effective and very simple and inexpensive cornice of common brick, and proves how much easier it is to do a good thing by not attempting too much ornament and variety.

GEOMETRICAL PATTERNS IN BRICKWORK.

II.

DESIGNS WITH HEADERS, USING TWO AND THREE COLORS.

ON Plate 93 we give a third collection of geometrical patterns for colored brickwork. The two preceding plates gave twenty-three designs, composed entirely of stretchers, and in two colors only. This month we give seven designs composed entirely of headers, and four of these allow of three colors. It is a good rule to follow to limit three-color patterns, and all two-color ones when the contrast is strong, to small structures, or to small portions in large structures when special accent is necessary. In the plate the conventional rendering represents black, red, and buff, and, as is the case with conventional expression of color, the result is more pronounced and more mechanical than it would be likely to be in any actually executed work. It is not necessary to carry out these patterns in the colors indicated, by any means.

Fig. 24, for instance, would work out in two shades of red, with mortar either white, or colored to match the lighter shade, or a light and dark buff, a gray and red, or a buff and red, with mortar to match the lighter brick. The same remarks apply to Fig. 25 and Fig. 26. The latter figure could be used on any small and defined surface that would bear accentuating, as, for example, the side of a chimney.

Fig. 27 is a large all-over pattern that would work out well in two shades of buff, and a Pompeian for the black bricks in the design. The mortar might be red, but would, we think, be better matching the lighter buff, which is the predominant color, and in this pattern work it is a good general rule to have the mortar colored to match the predominant color.

Fig. 28 would work out in the same manner, though a gray and two shades of red might be effective. This also will apply to best advantage on a limited surface.

Fig. 29 is adapted to broad surfaces, when a large pattern is needed to hold the scale of the building and relieve monotony. Two shades of red and a greenish black, laid in white mortar, the reds being none too carefully sorted, ought to come out well.

Fig. 30 will stand two dark colors and a contrasting light, as the predominant tone would be dark, and the relative amounts of surface will allow a stronger difference than ordinarily in the light brick. For quiet effect, two dull shades of red and a gray, laid possibly in gray mortar, would be effective.

This class of patterns is not of very general application, though, as in the case of American bond, there is no limit to the number of combinations. When the simpler diamond forms are departed from, trouble is close at hand for all, except those who are endowed with a decorative sense or a good training in the principles which underlie decoration. It is in the more common bonds that the best work comes, the Flemish being particularly adapted to diaper work.

As an example of good use in a quiet way, of a diaper pattern, refer to the photograph on page 251 of a house at Allegheny. It is barely noticeable, and is formed by sorting the bricks into extremes of shade.

BRICK STABLES.

IN our Baltimore letter in this number are some very good suggestions for simple brick stables that may prove useful to many a contractor.

AN ARCH AND A CORNICE.

ON page 242 are two drawings of a cornice and an arch motive, from Padua. While the cornice might prove rather difficult to approach without special terra-cotta work, the arch motive will work out fairly well with American stock patterns, and, by carefully consulting the catalogues of one or two leading makers, ornamental brick can be selected which will give practically the same effect.

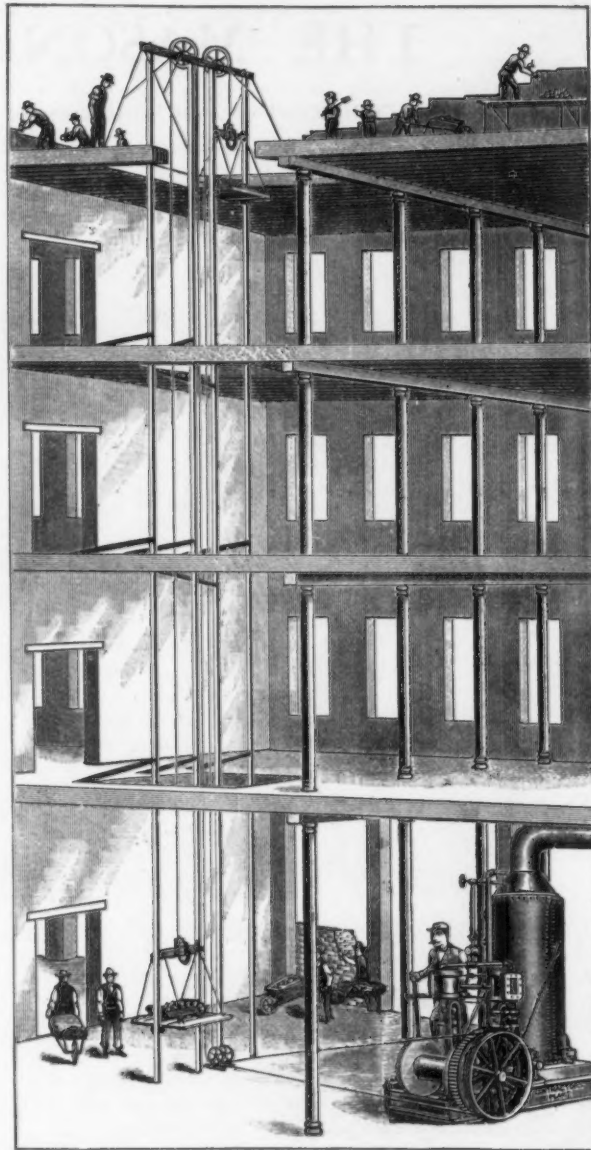
BRICK WINDOWS.

PLATE 88 shows an extremely good design for a group of four windows arranged in pairs. This suggestion is of direct value to every intelligent builder, for if one is at all apt at adapting ideas it will be not only comparatively easy but, at the same time, a very entertaining piece of work to mould this motive to fit actual work. A third pair of windows could be added to the group, and would work out finely for the second floor of a two-story store front. The bracketed stringcourse could be carried across the entire front, and if desirable, the broad piers between the pairs of windows could be narrowed or widened. The arch motive and the filling of the tympanums would present no difficulty, though terra-cotta might have to be used if the bracketed course were to be closely followed.

CONTRACTORS' ADDRESSES.

WE would like the address of every brick manufacturer who also contracts for brickwork, in order to send him a copy of the number containing our new Mason Contractors' department. Brick-makers who know of contractors in their locality likely to be interested in this new department are requested to forward names and addresses.

THE department of Mortars and Concretes is one that no mason contractor can afford to skip, as it will each month contain material of direct practical value to him.



Builders' Portable Material Elevator.

A most complete outfit for the elevation of materials. Will supply 100 masons with material on almost any height of building. Two balancing cages leave only weight of material to be raised. Changes made from floor to floor easily and quickly. The engine is complete with boiler, injector, safety-valve, steam gauge, and all connections, and is mounted on a steel frame. It has double cylinders, with reverse motion and friction drum foot brakes. Entire outfit is compact, easy to move, and simple to operate. Estimates and full particulars furnished upon application.

FOR DERRICKS, WINCHES, ENGINES, AND ALL
CONTRACTORS' SUPPLIES, GET OUR ESTIMATES.

Contractors' Plant Mfg. Co.,

129 ERIE STREET, BUFFALO, N. Y.

THE MANUFACTURER.

A Department devoted to the Market Side of Clay Production.

BUCKEYE TRADE TOPICS.

CLEVELAND, November, 1894.

TO write a market review or a trade retrospect without reference to the memorable depression now drawing to a close would be omitting a vital feature. It is not necessary to quote the chronic croaker and calamityist in order to give tone to what we have to say of the past irregular condition of the brick market. It is quite natural that a commercial demoralization continued for more than a twelve-month would affect the building trades, although, on the other hand, the depreciation of land and building material values should enhance the desire to build, particularly among people who need not depend upon wage-earning. Unfortunately, however, neither the moneyed nor the wage-working classes showed a disposition to avail themselves of the great opportunities thus offered, although the latter were given every inducement by the professional house builder or allotment agents.

Under ordinary conditions, Cleveland is a fast building town. Her wide area of residence property and unparalleled railway facilities to and from the suburban regions are in themselves suggestive of endless exploits in the building line. A city with such an abundance of land suitable for residence purposes, and such a variety of desirable sites, is naturally a city of homes, *i. e.*, homes owned by residents. Prior to the languid condition of affairs, one could travel for miles about Cleveland, and on every hand sight the beaver-like activity of her home builders. Then ensued the calm period, and a marked periodicity has attached to home-building progress ever since. In the business districts a like condition became prevalent. Scores of new and reconstructed business buildings had been planned, but they remained projects. It was an embryo condition all along the line, but the innate goaheadativeness of the American race soon wrested itself from its narrow confines. To-day we behold the *avant-couriers* of an unprecedented building activity, and old-time prosperity is not yet in sight. But to find a thing one must seek it, and success seems the greater when in pursuing it you meet it "half ways." Other communities would call Cleveland's building activity a boom, but a Cleveland is constitutionally against booms, and prefers the more sober Websterian appellation—activity. Within the past six months or so several great business blocks have been completed, and the foundations laid for more. The architects and contractors are busy looking after their commissions in the house-building line, for Cleveland means to not only renovate itself, but to add more architectural attractions to its galaxy of sky-piercing edifices and houses of God and man. And what is more, more substantial, more modern, more useful and ornamental material is being employed in the construction of new or reconstruction of razed buildings.

Brick in its many forms, from its pristine conceptions up to the artistic and scientific achievements of the day, is more than ever holding its own among competitive material. The frame builder of the earlier century is no longer a prophet; nor do his sanitary, hygienic, or economic principles hold good. In a few years the central business portion of Cleveland will be entirely free from antiquated or new frame structures, the work of annihilation having commenced in the later eighties. As to residences, there is also a tendency to substitute brick for wood, as the comparative cost is no longer a consideration. The carpentry class has lost its prestige as advocates, the frame-house cranks have been relegated to log-cabin history. If the architect be allowed to choose for himself he will, in most cases, base his estimates upon brick material, with or without stone and iron. Wood is no longer a factor; besides, building lumber is no longer a cheap material, nor is it a desirable material when we have to reckon with the insurance companies; besides, the wear and

tear of modern industry render wood not only expensive but useless as material for most manufacturing plants. Then again is the intrinsic value of timber depreciating, which is not only due to atmospheric influences but the artificial treatment in the mills.

Thus, as a competitor pioneer, carpentry methods, modes, and models are no longer an immovable obstacle in the path of the advancing brick-building era. True, there is a new and grosser factor to contend with—iron, and occasionally paper. Stone, the ideal material of the ancients, is also entering upon a new era, but being not so accessible as iron, it will never again win back its Roman prestige and ubiquitousness. Cleveland is both an important stone and iron town, and it goes without saying that the people engaged therein are very active in counteracting the brick prestige and influencing the building market against it. Thanks to the latter-day evolutions in brick manufacture, the counteraction of these competitive factors remains barren of results, as a rule, excepting in cases where stone would prove the better component for practical or scientific reasons, if such actually exist. The ever-increasing contact of Americans with continental Europeans in European cities, a great many of which are models of brick architecture, has done no little in convincing the ever-observant American that there is more beauty in a natty brick home than in a gayly painted wood-clad and wood-gabled cottage or villa whenever the abode is to be a permanent one. This same American, once upon his shores again, remembered that his country's brick industry was a thing to be proud of, for its fame was echoed to him in other lands; he also remembered having read in some scientific publication that to move a brick house intact was no more of an impossibility than the rolling away of a frame house, should such a contingency ensue.

Of course, both stone and iron have their superior uses in architecture, and that they supplanted wood is rather an achievement than a calamity, but when employed in the construction of chimneys, cornices, arches, belt courses, or other ornamental parts, we say they are out of place. Recently we have noted the introduction of steel stacks, but experience has taught that a brick lining to these stacks would greatly improve their service and age. Had these stacks been constructed of brick in the first place, no trouble would have ensued during their natural life of serviceability. The idea of constructing a building of wood and then cover it with corrugated or other plate is certainly very modern, and modern still is the plate building without a wooden lining; but information gathered as to the practicability of these structures is not very favorable as a recommendation. It appears as if these very buildings, had they originally been constructed of brick, would not only have outlasted the modern fangles many years, but would have been far more recommendable from an economical standpoint.

It has been said that Cleveland's brick-manufacturing industry has seen its halcyon days. What injustice and rot! The business was never greater. No one will dispute that profits have decreased; that dividends are no longer enormous; that brick kings are a thing of the past. One must consider the over-productive market together with the sharp competition from the outside. Cleveland has yet manufacturers known the country over, and puts out some specialties in new staples which have a good renown. Several outside manufacturers maintain offices here, which goes to show that Cleveland is a desirable home and distributing market. Brick is not proscribed in this market, although certain manufacturers have been guilty of poor production. It is the disgruntled hand brickmaker out of a job who jeers Cleveland's brick industry, and cries down the heavens upon his competitor—machinery.

I. B. R.

TRADE NOTES.

Yard Equipment.

M. H. CRUMP, Bowling Green, Ky., wants information about latest lime kilns.

THE WEIR BRICK COMPANY, of Elmira, N. Y., is erecting fourteen new kilns.

THE SHALE BRICK COMPANY, of Catskill, N. Y., have invested \$70,000 in the erection of a plant.

THE ALBANY, GA., BRICK COMPANY are about to rebuild their plant, which was recently burned.

THE STEWART BRICK COMPANY, of Parkersburg, W. Va., will put in machinery for 15,000 pressed brick per day.

AN extensive deposit of good fire-clay has been opened up at Latrobe, Pa., and arrangements are under way for working it.

THE EDWIN BENNETT POTTERY COMPANY, Baltimore, will increase its output one fourth, giving employment to one hundred more hands.

D. B. ANDERSON, of the Great Western Fire Clay Company of Toronto, Ohio, has patented important improvements in sewer-pipe machinery.

THE MILL HALL (PA.) WALL PLASTER is in the market for a mill to manufacture wall plaster. The company wants a mixer for dry material.

Clay Materials.

ON another page appears the new advertisement of the Pennsylvania Enamelled Brick Company, formerly the Griffin Company. The very high standard of this concern's product needs no reiteration here, and it would seem that, with the backing of Mr. William F. Burden and the management of President James L. Rankin, success is already an assured fact.

WE would call attention to the advertisement of the Somerset and Johnsonburg Manufacturing Company which appears on page iii. This company is making a very fine enamel brick which is growing in popularity very fast. A few of the many new buildings wherein their enamel bricks have been used are, the Massachusetts State House extension, Wentworth Building, city of Boston; Chester Park Hospital, Boston; White Dormitory, Yale College, Hartford; and Carnegie Library, Pittsburgh.

ANY manufacturer who can show a letter like the following from so large and exacting builders as the famous George A. Fuller Company has reason to be proud:—

CHICAGO, Nov. 2, 1894.

J. VAN INWAGEN, ESQ., President Tiffany Pressed Brick Company, 403 Chamber of Commerce Building, Chicago:

Dear Sir, — We have used about 160,000 of your American manufactured enamelled brick (English size) in the Marquette Building, the largest and most expensive office building in the West. They have proved very satisfactory as to quality, finish, etc., and we believe them to be equal to those of the best English manufacture.

Yours truly,

GEORGE A. FULLER CO.,
Per GEORGE A. FULLER, President.

Cement Notes.

H. S. DUVAL, of River Junction, Fla., has about perfected arrangements with a Northern syndicate to erect a \$50,000 cement plant.

THE MELAN ARCH CONSTRUCTION COMPANY has been awarded the contract for a bridge in Eden Park, Cincinnati, for \$7,130. The bridge is to be of seventy-foot span, reaching over Park Avenue. Its total length is to be one hundred and twenty feet, width thirty-four feet. The contract calls for completion in sixty days. The Melan System is exceedingly ingenious and well adapted for long-span bridges. Fr. von Emperger, of 71 Broadway, New York, is the consulting engineer of the company.

THE Buffalo Courier recently contained an interesting description of the new plant, at Cassadaga, N. Y., of the Chautauqua Cement Company. A thoroughly equipped plant has been put in operation. The company owns nearly one hundred acres, containing a bed of marl from three to fifteen feet thick lying about two feet below the surface. Beneath the marl is a deposit of clay varying from ten to one hundred and fifty feet deep. The Courier states that there are probably thousands of acres of this sort in that section.

Miscellaneous.

J. B. PRESCOTT & SON, of Webster, Mass., manufacturers of the Morse patent wall tie, have recently brought out a veneer wall tie which they will shortly place on the market. The above is a very clever method for securing veneer brick walls to a frame building, and will without doubt have a very extended use.

THE Salamander fireproof composition manufactured by the American Fireproofing Company, Boston, has been placed in the flooring of the new Castle Square Hotel. This adds one more to a large list of prominent buildings in this city wherein the Salamander fireproofing has been adopted on the merits of actual tests.

W. S. RAVENSCROFT, Ridgway, Pa., seeks purchaser for one-half interest in a profitable brick plant.

THE SIMPSON BRICK PRESS.

The only American brick machine to receive
official recognition from the authorized judge
on brick machinery at the

WORLD'S COLUMBIAN EXPOSITION.

It is replete with time and labor saving devices, and its product always commands the highest market price by reason of their beauty and hardness.

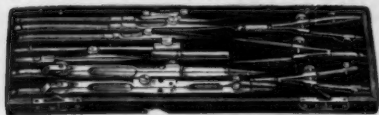
In no single detail of its *simple, powerful and ingenious* mechanism is this press susceptible of improvement. We are also manufacturers and dealers in full brick-yard equipments, and are prepared to estimate on and construct complete plants. We are also prepared to test all brick-making material sent to our address in Chicago. For prices, terms and other information, address,

THE SIMPSON BRICK PRESS CO.,

No. 415 Chamber of Commerce Building, - - - - - Chicago, Ill.

Agents for Canada, WATEROUS ENGINE WORKS CO., Brantford.

BALL, BALL CO. (Ltd.), Frankford, Philadelphia.
American Manufacturers of
DRAWING INSTRUMENTS, AND A PATENTED PEN.



JUST PUBLISHED.

THE
Architects' Directory
FOR 1894.

Containing a list of the Practising Architects
of the

UNITED STATES AND CANADA.

MANUFACTURERS AND DEALERS CAN-
NOT AFFORD TO BE WITHOUT ONE.

Handsomely Bound, Price, Postpaid, \$1.

WILLIAM T. COMSTOCK,
PUBLISHER,
23 Warren St., New York.

"STAR" Ventilator



Storm-Proof—Largest Area.
MERCHANT & CO., (INC.)
PHILADELPHIA. CHICAGO. NEW YORK.

FOR INFORMATION ABOUT
U. S. MAIL CHUTES,

Which are a necessity in Office Buildings and
Hotels, write to the sole makers

THE CUTLER MFG CO., ROCHESTER, N. Y.

PATENTED. AUTHORIZED.

PATENTS.

HUGH M. STERLING,

ATTORNEY-AT-LAW,

Formerly with the late L. W. SINSABAUGH.

Special experience in procuring Patents on Brick
Machinery, and in all matters appertaining to the
Brick-Making Art. CORRESPONDENCE INVITED.

Rooms 60, 61 & 62 McGill Building, Washington, D. C.

WANTED.

A good Subscription Solicitor for
THE BRICKBUILDER in every city
and town in the United States and
Canada.

**ACADEMY OF ARCHITECTURE AND
BUILDING**, 840 So. Eighth Street, St. Louis.
An institute for the technical education of Draughtsmen
and Building Tradesmen. Lessons by MAIL for home
instruction. Send postal for Prospectus.
Plans for public and private buildings promptly pre-
pared.
PRINCIPAL, H. MAACK, Architect.
Author of *A Stair Scale* (\$1). No dividers: no
figuring.

ARCHITECTURE

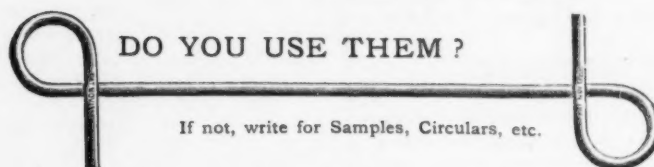


DIPLOMAS AWARDED. Courses in other trades,
all including thorough instruction in Mathematics
and Physics. Send for FREE circular stating sub-
ject you wish to study to The Correspondence
School of Industrial Sciences, Scranton, Pa.

Progressive Architects Use the

Morse Patent Wall Tie

For bonding Hollow Walls, Brick Facings, etc.
It is Strong and Reliable.



DO YOU USE THEM?

If not, write for Samples, Circulars, etc.

J. B. PRESCOTT & SON, Sole Manufacturers,

N. Y. Office: 62 Reade St.

Webster, Mass.



IT WILL PAY YOU TO INVESTIGATE THE

NEW MODEL HAMMOND

BEFORE BUYING ANY OTHER TYPEWRITER.

CALL OR SEND FOR CIRCULAR REGARDING OUR

\$100.00, \$75.00, and \$50.00 HAMMOND.

THE HAMMOND TYPEWRITER CO.,

300 Washington St., BOSTON.

.. WANTED ..

A SALESMAN who thoroughly understands front bricks and fire-
proof building material, terra-cotta, etc., one who
can read architects' plans, and knows the architects and building trade of the
Eastern States, and can come well recommended. Please state experience and
give references. Apply by letter.

W. B. CO., ROOM 20, 94 Liberty St., NEW YORK.

POMPEIIAN,
BUFF, AND RED PRESSED,
ALSO ORNAMENTAL

BRICK

OF ANY COLORS
AND
OF ALL SHAPES.

Capacity, 100,000,000 per annum.

FACE BRICK MANTELS.

BRICK FIREPLACES.

JARDEN BRICK COMPANY,

BRICKS GROUND FOR ARCHES
A SPECIALTY.

Send for our Illustrated Catalogue with Price List.

Office, No. 9 N. 13th Street, Philadelphia, Pa.



BANK SAFES,

VAULT DOORS,

HOUSE SAFES,

SAFE DEPOSIT VAULTS.

Estimates given on all
classes of Safe work.

A First-Class Fireproof Office Safe for \$50.00.

OVER 150,000 IN DAILY USE.

CHAMPION RECORD

in the Chicago, Boston (1872), Haverhill,
Lynn, and Boston (1892) Fires.

BRICKMAKERS, WAIT

... FOR THE ...

Revolutionizer in Brickmaking

JONATHAN CREAGER'S SONS,

CINCINNATI, OHIO.

CARTWRIGHT ELECTRIC CO.,

145 Milk St., - - BOSTON, MASS.

Electrical Engineers and Contractors for all kinds of Electrical Construction. Complete Lighting Plants for Factories, Mills, Buildings, etc. House Wiring and Fixtures. Manufacturers of Porcelain Specialties, and "Cartwright Fan Motors." Specifications. Supervision. Estimates cheerfully furnished.

MENTION BRICKBUILDER.

INDUSTRIAL
DEPARTMENT

A WORD TO MANUFACTURERS.

This Department is organized for the purpose of aiding in the location of plants along the line of its road.

No section in the country has greater resources to attract the manufacturer. Cheap coal, and an abundance of raw material, iron ore, copper, zinc, tin, gold, silver and other metals, hard and soft woods, clays of all grades, stone, tan bark, flax, straw, etc., are abundant, and the Burlington Route, operating over 7000 miles of road and reaching every important city between the Great Lakes and the Rocky Mountains, offers advantages as a distributor which are obvious. Many of the cities and towns on the line offer liberal inducements to encourage the establishment of factories. The undersigned solicits correspondence, and, besides furnishing detailed information, is prepared to assist by every means in his power in the promotion of the interests of manufacturers desiring to locate in the West.

GEO. H. ROSS,
Supt. Industrial Dep't,
CHICAGO, ILL.

Form A. 190.

Why Pay Royalties?

Why Pay Yard Rights?

When You Can Get

BICKEL'S IMPROVED DOWN-DRAFT KILN

Guaranteed Without.

We will build this Kiln and *guarantee* it to give satisfaction, either by contract or on a per cent basis.

This Kiln is Simple and Durable in Construction, and Economical in operation, and does not require an expert to handle it. Any good burner, who understands his business, can easily manage it.

There are no small tile to break or burn out, and no iron exposed to the flames.

This Kiln is built strong, and to any desired size, and adapted to burning Fire Brick, Vitrified Brick, and Dry Pressed Brick, and all kinds of Pottery goods. Built Square or Round.

Advantages of BICKEL'S IMPROVED DOWN-DRAFT KILN: It burns the brick uniform throughout. It has *no* light or salmon brick in bottom courses. It does *not* burn the bottom courses at the expense of the top. It does *not* check or crack the brick as an up and down, or combined draft kiln will, and costs you more money to build.

For further information, address

BICKEL BROS. CONTRACTING CO., - - 290 Market St., St. Louis, Mo.

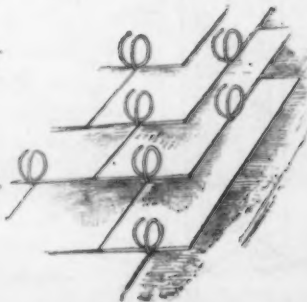
FOLSOM PATENT ROOF SNOW GUARDS,

FOR OLD AND NEW ROOFS, SLATE, SHINGLE AND TILE.



The Folsom Method is Scientific and is displacing the Guard Rail.

Correspondence Solicited.



ROOF SHOWING NEW MODEL GUARDS.

FOLSOM SNOW GUARD CO.,

33 Lincoln Street, BOSTON, MASS.

The
Architect and Builder.A MONTHLY JOURNAL REPRESENTING THE BUILDING
INTERESTS OF

Duluth and Superior AND THE Lake Superior Region.

SUBSCRIPTION PRICE, \$2.00 PER ANNUM.

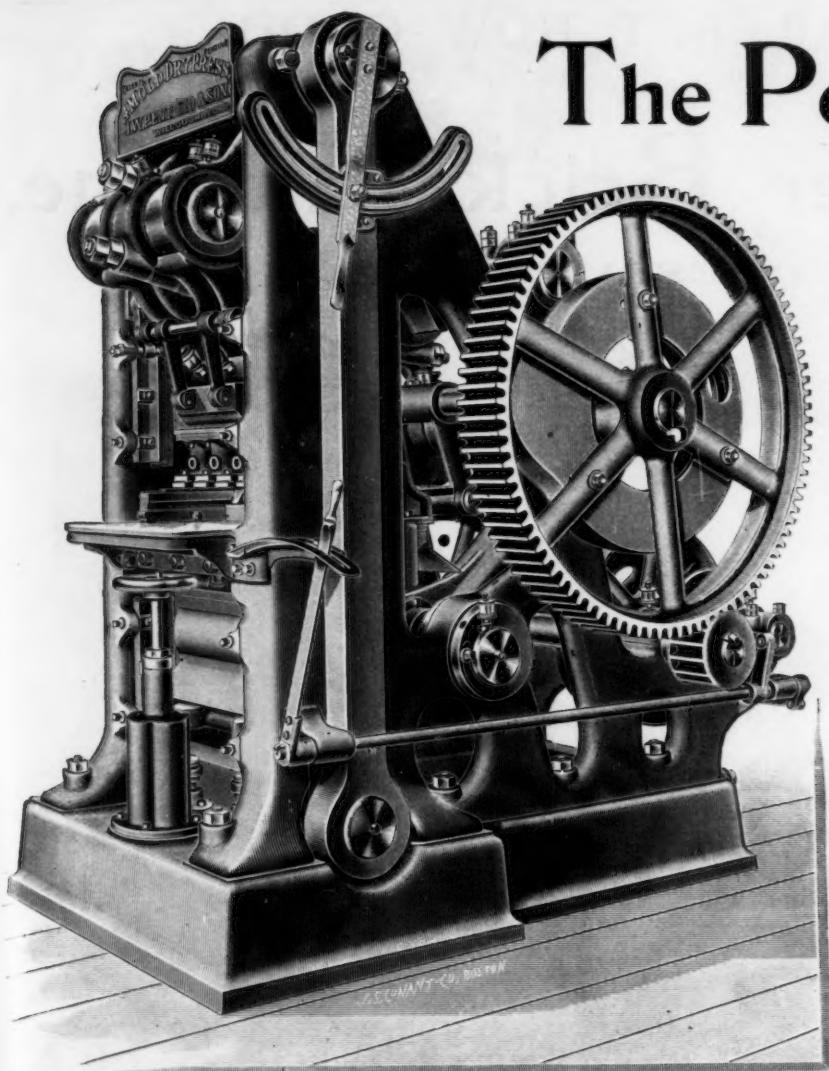
323 West Superior Street, = = Duluth, Minn.

The Penfield Dry Press Brick Machine

Accomplishes all that other dry press machines do and then goes ahead and gives the brick an extra pressure with increased force and length of stroke, making the brick denser, stronger and more perfect in every way.

It puts more clay into a brick of a given size than is done by any other machine on the market.

The thickness of the brick and the amount of clay pressed into each brick can be quickly regulated.



THE PENFIELD 4-MOULD DRY PRESS BRICK MACHINE.

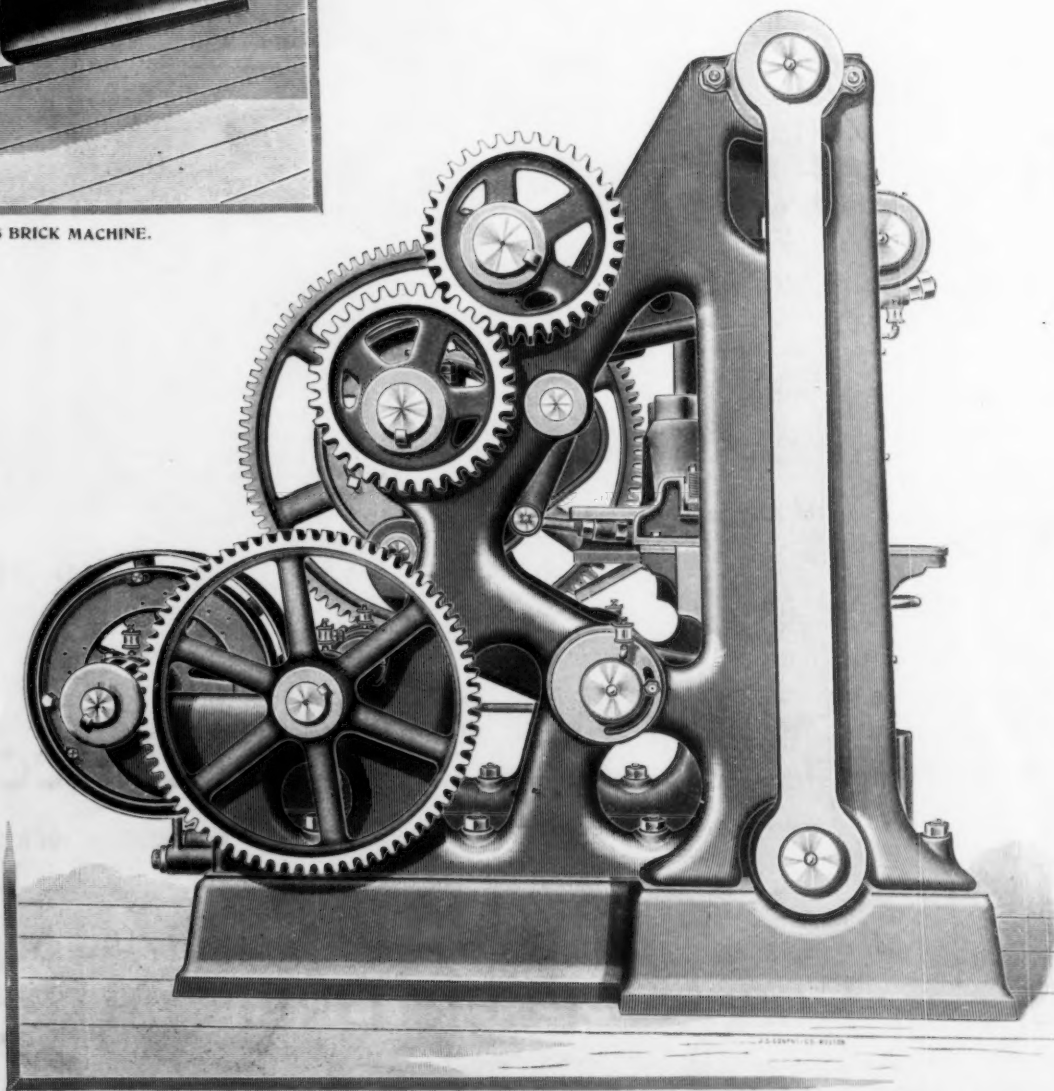
The Dry Pressed Brick

Made by the Penfield Machine cannot be surpassed for density, solidity, strength, beauty of finish or perfection of outline. They please both the brick maker and the brick buyer, and ensure the manufacturer a rapidly increasing and thoroughly satisfied list of customers.

Write for particulars of the Penfield Press. For the asking, we'll tell you all about it.

J. W. Penfield & Son,

Willoughby, Ohio, U. S. A.



PENFIELD 4-MOULD DRY PRESS BRICK MACHINE. (SIDE VIEW.)

NOT HOW CHEAP, BUT HOW GOOD.

The Ross-Keller Brick Machine.

(TRIPLE PRESSURE.)

Weight, 75,000 Pounds. = = = = =

Capacity, 35,000 to 40,000 Brick per Day.

This Press works dry or semi-dry clay, and makes six brick at each revolution,

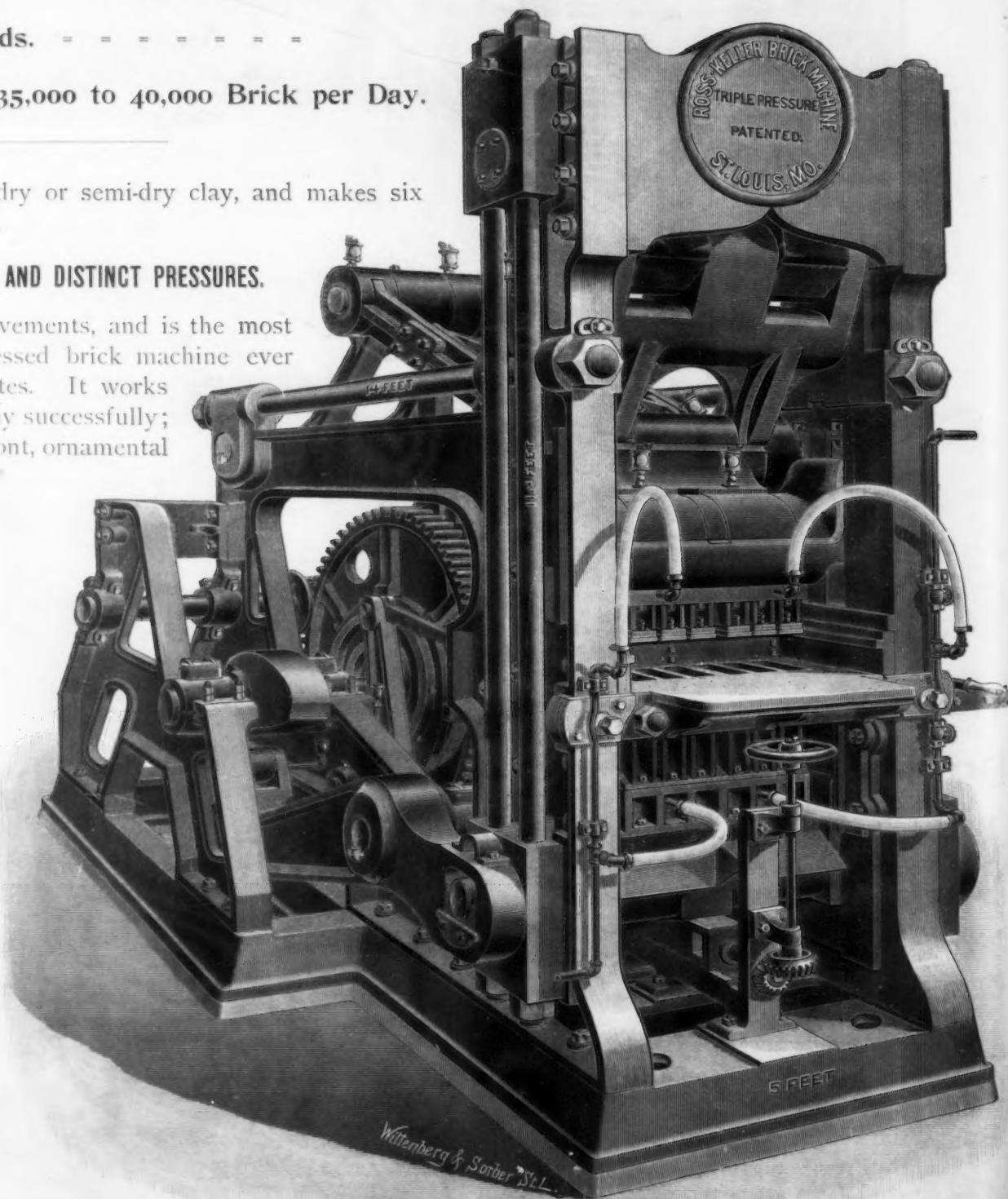
HAVING THREE SEPARATE AND DISTINCT PRESSURES.

It is noiseless in its movements, and is the most simple and powerful pressed brick machine ever built in the United States. It works Shale and all kinds of clay successfully; makes the very finest front, ornamental and Pompeian brick, removing all granulation from face of same. It presses the brick equally on both sides, and heavier than any other press. It has wide bearings bushed with bronze, and all pins and shafts are made of five, six, and seven inch forged steel.

For large works making fine front and ornamental brick this press is unexcelled. Don't buy until you come and see us.

CORRESPONDENCE SOLICITED.

For circulars, price and other particulars, address,



ROSS-KELLER BRICK MACHINE CO.,

Room 201, Laclede Building, = = = = = ST. LOUIS, MO., U. S. A.

Powhatan Clay Manufacturing Co.

— RICHMOND, VA. —



Manufacturers of Fine Front Brick in all Colors.

STANDARD AND ROMAN SIZES.



OUR WHITE CLAY BRICK

IN APPEARANCE UNSURPASSED.

MADE FROM A GENUINE WHITE CLAY.

DOES NOT DISCOLOR WHEN EXPOSED TO THE WEATHER.

We also manufacture Repressed Bricks, Red, Gray, Buff, Speckled, etc.

Fireproof Building Material, Drain Tile, etc.

NEW YORK AGENTS,
Pfotenhauer & Nesbit,
Metropolitan Building,
Madison Square.

HOME OFFICE,
Richmond, Va.,
H. K. Terry, Gen'l Manager.

WASHINGTON, D. C., OFFICE,
808 F Street, N. W.,
E. A. Keeling, Manager.

NEW ENGLAND AGENT,
W. H. Gates
30 Kilby Street, Boston.

EDWARD D. EMERSON, Prest.

WARREN H. SANFORD, Agent.

Somerset & Johnsonburg Mfg. Co.,

MANUFACTURERS OF

Standard Quality

Enameled Brick and Vitrified Shale Paving Brick.



We are prepared to give prompt attention
and solicit patronage.



SALES OFFICE:
166 Devonshire Street, Boston, Mass.
Telephone 2757.

FACTORIES:
Somerset, Mass., and Johnsonburg, Pa.
Long Distance Telephone, Somerset, Mass.

WORKS:
Mays Landing,
N. J.

H. F. MAYLAND,

SOLE SELLING AGENT

INDUSTRIAL BRICK CO.,

MANUFACTURERS OF

OFFICE:
United Charities Building,
ROOM 613,
New York City.

Superior Quality Front Brick in all Colors.

Plain and Ornamental or
Fancy Front

BRICK,

FIRE BRICK, FLUE LINING, FIREPROOFING,

ROOFING



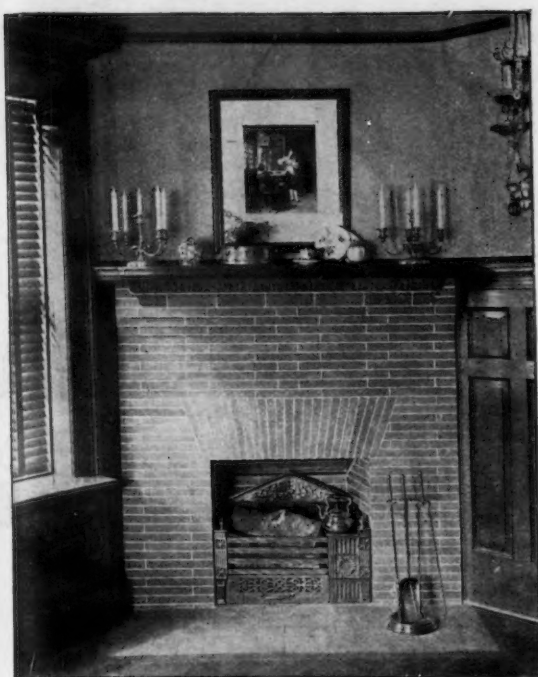
TILE,

Architectural Terra-Cotta.

W. H. GATES,

30 Kilby St., BOSTON.

ESTIMATES FURNISHED ON EVERYTHING IN THE CLAY LINE.



THESE ILLUSTRATIONS
SHOW
THE CHARACTER OF WORK
WE
ARE DOING.



The Latest Designs,
The Latest Colors,
In Brick, such as
Reds, Buffs, Grays, Browns,
Mottled and Romans,

ARE MADE BY



THE CENTRAL PRESS BRICK CO.,

29 EUCLID AVE., - CLEVELAND, O.



YOU CAN SEE SAMPLES

And get Prices at the Following
Offices:

809 Medinah Building,	-	Chicago, Ill.
902 Neave Building,	-	Cincinnati, O.
Fiske, Homes & Co.,	-	Boston, Mass.
Cutler & Gibley,	-	Duluth, Minn.
T. J. Graham,	-	Memphis, Tenn.



NEW YORK
ARCHITECTURAL TERRA-COTTA
COMPANY.

OFFICE,
38 PARK ROW,
New York City.

WORKS,
LONG ISLAND CITY,
New York.

STEPHENS, ARMSTRONG & CONKLING,
Branch of New York Architectural Terra-Cotta Co.,
1341 Arch Street, Philadelphia, Pa.

GENERAL AGENTS FOR NEW ENGLAND:
BOSTON FIRE BRICK COMPANY,
Fiske, Homes & Co., Managers,
164 Devonshire Street, Boston, Mass.

GENERAL AGENTS FOR THE SOUTHERN STATES:
THE REDFIELD COMPANY.

OFFICES:
NEW ORLEANS, LA., 192 Common St.
Harrole & Merz, Managers.
ATLANTA, GA., 52 Crew St.
M. A. Naef, Manager.
JACKSONVILLE, FLA., 48 West Bay St.
Wm. T. Cotter, Manager.
GALVESTON, TEX., 2109 Mechanic St.
J. E. Golleher, Manager.
SAN ANTONIO, TEX., 124 Soledad St.
C. A. Canter, Manager.
DALLAS, TEX., 9 Cockerel Annex Bldg.
J. E. Canter, Manager.
LITTLE ROCK, ARK., Board of Trade Bldg.
E. S. Green, Manager.



THE HYDRAVLC PRESS BRICK COMPANIES

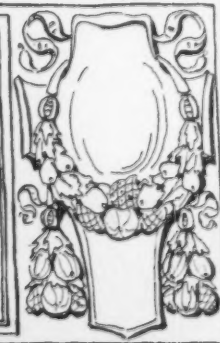
EGSTERLING · PRESIDENT & H.W. ELIOT · SECY & TREAS



CHURCH OF SAINT CECILIA AT ROME. THE CAMPANILE.



THE HYDRAVLC PRESS BRICK®	NEW YORK HYDRAVLC PRESS BRK®
· ST. LOUIS · MO ·	· ROCHESTER · NY ·
OMAHA HYDRAVLC PRESS BRICK®	EASTERN HYDRAVLC PRESS BRICK®
· OMAHA · NEB ·	· PHILADELPHIA · PENN ·
KANSAS-CY HYDRAVLC PRESS BRK®	WASHINGTON HYDRAVLC PRESS BRK®
· KANSAS · CITY · MO ·	· WASHINGTON · D · C ·
NORTHERN HYDRAVLC PRESS BRK®	ILLINOIS HYDRAVLC PRESS BRICK®
· MINNEAPOLIS · MINN ·	· ST · LOUIS · MO ·
CHICAGO HYDRAVLC PRESS BRK®	FINDLAY HYDRAVLC PRESS BRK®
· CHICAGO · ILLS ·	· FINDLAY & TOLEDO · OHIO ·



J A S T R E E N D E S T P A N S E P T E M B E R 1 8 9 3

Perth Amboy Terra-Cotta Co.

Perth Amboy, N. J.

Manufacturers Architectural Terra-Cotta Special Color Front Bricks

New York Office, 289 Fourth Avenue.

Philadelphia Office, 1044 Drexel Building.

Boston Agents, Waldo Bros., 88 Water St.

Excelsior Terra-Cotta Company

... Manufacturers of



*Architectural Terra-Cotta and
Superior Front Brick
In Special Colors.*

Works:
Rocky Hill, N. Y.



*W. H. Gates, New England Representative,
Office, 30 Kilby Street, Boston.*

*105 East 22d Street,
New York.*

PHILIP CORBIN, PRESIDENT.

G. B. POST, SECRETARY.

C. E. WETMORE, TREASURER.

G. S. BARKENTIN, MANAGER.

... Manufacturers of
*Fine Architectural
Terra Cotta
in all Colors.*



Office and Works, Berlin, Conn.
P. O. Address, New Britain, Conn.

The
New
Britain
Architectural
Terra
Cotta
Company.

... Agents for
*Blandford Brick and
Tile Company's
Moulded and
Ornamental
Brick.*



New Britain, Conn.

BOSTON FIRE-BRICK WORKS,

FISKE, HOMES & CO., Managers.

Architectural Terra-Cotta.



Specialties in Building Bricks in all Colors
known to Clay-Working.



OFFICE: 164 DEVONSHIRE ST., BOSTON.

NEW YORK OFFICE: Charities Building, 289 4th Ave.

PHILADELPHIA OFFICE: 24 South 7th St.

Factories: 394 Federal St., and K St., cor. 1st St., South Boston.

AMERICAN TERRA-COTTA AND CERAMIC COMPANY,

Works at Terra-Cotta, Illinois.

OFFICE: 605 MANHATTAN BUILDING, - CHICAGO.

Standard Terra-Cotta Company,

PERTH AMBOY, N. J.,

Manufacturers of

Architectural Terra-Cotta

In all its branches, to match all colors of brick or stone.



Boston Office, 21 Equitable Building, 150 Devonshire St.

Telephone 3592.

O. W. Peterson, Selling Agent.

GLENS FALLS TERRA-COTTA AND BRICK CO.,

... Glens Falls, N. Y. ...



RED AND BUFF, PLAIN AND MOULDED PRESSED BRICK.

ARCHITECTURAL TERRA-COTTA,

... RED OR BUFF. ...



Catalogues Sent on Application.



NEW YORK OFFICE: : : : 130 WEST TWENTY-THIRD STREET.

WORKS AT BERLIN STATION,

TWO MINUTES'

WALK.

POSTOFFICE ADDRESS

NEW BRITAIN,

CONN.



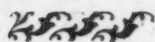
WASHED FACE BRICK

... A SPECIALTY.

PALLET FACE, SEWER, AND

... PAVING BRICK. ...

Brick Made in Buff, Old Gold,
or any Color Desired.



A New and Complete Plant for the Manufacture of High-Grade

ARCHITECTURAL TERRA-COTTA.

..... IT WILL PAY YOU TO GET OUR ESTIMATES.

AKRON VITRIFIED PRESSED BRICK CO.,

AKRON, OHIO.

Manufacturers of the finest Pressed Brick in the world, one of the largest and best equipped plants, a clay the richest and purest known, and with all as complete a set of skilled workmen as money can secure, all of which make it possible for them to have turned out some of the finest work ever produced from clay.

They are in position to make anything in the way of special or ornamental brick that may be desired; their brick are so extremely hard that they produce the finest effect when used in mantels or other inside work.

Write them for catalogues or estimates.



S. D. B. CHURCH, PLAINFIELD, N. J. — S. TEALE, ARCHITECT, NEW YORK.

OUR PATENT CONOSERA TILES

With which the church here shown is covered, are the strongest, tightest, boldest, and most mobile in expression of any tiles ever made. Deep interlocking flanges render them tight even without cement. They are made in five widths, which may be used in combination if desired, producing novel effects and adapting them for use on conical and warped surfaces. CONOSERA TILES to fit ANY CONE are kept in stock.

CATALOGUES AND ESTIMATES SENT WHEN DESIRED.
CHICAGO OFFICE, CHARLES T. HARRIS & CO., 809 Medinah Bldg.

CELADON TERRA-COTTA Co., Limited,

(PAID-UP CAPITAL, \$150,000.00)

ALFRED, N. Y.

Manufacturers of VITRIFIED TERRA-COTTA,

Artistic Roofing Tiles.

All our Tiles are made from a superior quality of clay, formed under heavy pressure, and burned to complete vitrification, so that they are non-absorbent, strong, and do not require to be glazed to render them durable.

We would call special attention to our new patent Shingle Tile which we are just introducing. For beauty and cheapness it cannot be surpassed.

OUR PATENT COMBINATION TILES

Comprise fourteen distinct shapes or styles, interchangeable in all possible combinations, giving any variety of effect desired by the architect, either for siding or roofing. **OUR HORN TILES** (two styles) act as snow guards and as a footing on the roof, besides being highly ornamental. Special Eave and Gable Tiles make appropriate and artistic finish on these lines.

The unusual depth of the flanges and the method of interlocking make these Combination Tile perfectly wind and rain tight, even when laid without cement. When cement is preferred a very small quantity is sufficient.

AGENCIES: ARLANDO MARINE, 38 Park Row, New York. E. L. HYDE, 136 Liberty St., New York.
J. K. SMITH, Special Agent, 7 First Ave., Waterbury, Conn.

FRED'K W. MEEKER.

JAMES W. CARTER.

PAUL E. O'BRIEN.

MEEKER & CARTER,

14 EAST 23d STREET, NEW YORK,

SOLE AGENTS FOR THE

STATEN ISLAND TERRA-COTTA LUMBER CO.,

OF WOODBRIDGE, N. J.



Ornamental Front Bricks, Terra-Cotta, Fire-Proofing
Materials, Fire Brick, Etc.

SOLE AGENTS FOR

The Farnley English Glazed Bricks,

IMPORTED IN ALL COLORS.

Estimates Given on Fire-Proof Work of all Descriptions.

TELEPHONE CALL—751, 18th.

The New Jersey Terra-Cotta Company,

K. MATHIASON, PRESIDENT.

Architectural Terra-Cotta,
Plain and Ornamental Pressed Bricks.



108 FULTON STREET,

NEW YORK CITY.

JOSEPH D. BAUCUS, President.

JNO. W. D. DOBLER, Treasurer and Manager.

MANHATTAN MOSAIC AND MARBLE COMPANY,

MANUFACTURERS OF

MANHATTAN MOSAIC TILE AND MANHATTAN MOSAIC MARBLE.

PROTECTED BY PATENTS.

For all kinds of Floor Tiling, Wainscoting plain and ornamental, Mantels, Hearths, and Slabs. Building Blocks for the exterior of all kinds of building, in any shape, form, and color, according to designs and plans. Treads and Risers superior and more durable than Marble or Slate, and at a much less cost than Marble.

The Manhattan Mosaic Tile is pronounced to be the **best Floor Tile** manufactured.

OFFICE AND SHOWROOM,

Metropolitan Building, Madison Ave. and 23d Street, New York.

FACTORY:
STAMFORD, CONN.

27,000,000 FINE BRICKS ANNUALLY

... MADE BY ...

Anthony Ittner, St. Louis.

ESTABLISHED 1859.

Office in the Telephone Building.

Yards at St. Louis, Mo., and Belleville, Ill.

These bricks are perfectly homogeneous, therefore

Cut Easily, Exactly,

And with Inappreciable Waste.

Owing to detail of manufacture the output does not vary in quality.

ITTNER'S MORTAR COLORS.

SPECIAL ATTENTION is called to ITTNER'S MORTAR COLORS manufactured specially for us at South Milwaukee, Wis. We guarantee our Colors not to Fade, and recommend that from 35 to 40 pounds of color be used to lay a thousand brick. We have BLACK, BROWN, RED, and BUFF.

ROMAN AND REGULAR-SIZE FACE BRICK

IN BUFF, CRAY, BLACK, MAHOGANY, AND MOTTLED COLORS, AND IN ALL ORNAMENTAL SHAPES, IN LENGTHS OF 18 INCHES IF NECESSARY.

Our method of manufacture is different from that used by others; our product is especially hard, has a texture and surface superior to the ordinary brick, and produces an artistic effect that cannot be excelled.

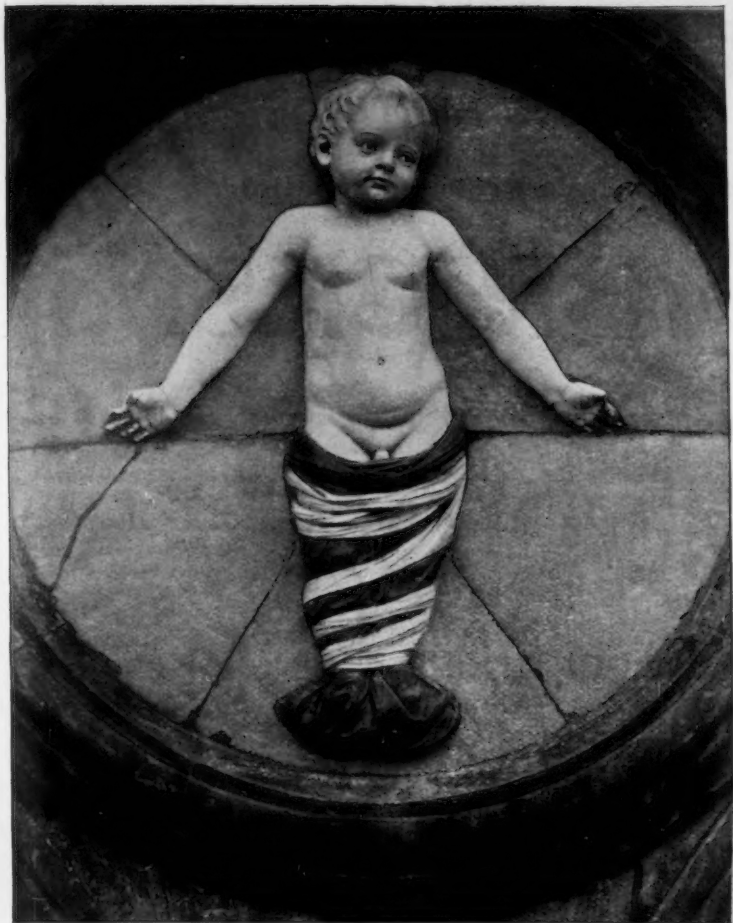
EVENS & HOWARD, Manufacturers,

ST. LOUIS, MO.

Our products for thirty years have been standard in all markets.

INDEX TO ADVERTISEMENTS.

ARCHITECTURAL FAIENCE.	PAGE	BRICK (Pressed and Ornamental).	PAGE	ELECTRICAL ENGINEERING.	PAGE	MOSAIC WORK.	PAGE
Atwood Faience Co.	xv.	Raritan Hollow and Porous Brick Company	252	Cartwright Electric Co.	xviii.	Manhattan Mosaic and Marble Co.	xiii.
Also Glazed and Enamelled Brick and Terra-Cotta.		Tiffany Pressed Brick Company	ii.	ENGINEERS AND CONTRACTORS.		OFFICE FITTINGS.	
ARCHITECTURAL INSTRUCTION.		BRICK MACHINES.		Aberthaw Construction Co.	261	Geo. E. Foster & Co.	xvii.
Academy of Architecture	xvii.	See Clayworking Machinery.		FIRE BRICK.		Hammond Typewriter Company	xvii.
Correspondence School of Architecture	xvii.	BRICKYARD SUPPLIES.		Fiske, Homes & Co.	ix.	PATENTS.	
ARCHITECTURAL TERRA-COTTA.		See Clayworking Machinery.		FIREPROOFING MATERIALS.		Hugh M. Sterling	xvii.
American Terra-Cotta and Ceramic Company.	x.	CEMENT.		Aberthaw Construction Co.	261	POROUS TERRA-COTTA.	
Donnelly Brick Co.	xi.	Aberthaw Construction Co.	261	Empire Fireproofing Company	259	See Fireproofing.	
Excelsior Terra-Cotta Co.	xiii.	Atlas Cement Co.	265	Fredenburg & Lounsbury	iii.	PUBLICATIONS.	
Glens Falls Terra-Cotta and Brick Co.	xiii.	Alsen's Portland Cement	266	Meeker & Carter	xiii.	See Books and Periodicals.	
Meeker & Carter	xiii.	James Brand	262	Metropolitan Fireproofing Co.	257	RAILROADS.	
New Britain Terra-Cotta Co.	ix.	Henry R. Brigham	260	Lorillard Brick Works Company	xvi.	Burlington Route.	xviii.
New York Architectural Terra-Cotta Co.	vi.	Cummings Cement Co.	263	Pittsburgh Terra-Cotta Lumber Co.	xvii.	ROCK EMERY.	
Fiske, Homes & Co.	ix.	Morris Ebert	262	Powhatan Clay Mfg. Co.	iii.	Sturtevant Mill Co.	264
W. H. Gates	iv.	Lawrence Cement Company	266	Raritan Hollow and Porous Brick Company	252	ROOFING TILES.	
New Jersey Terra-Cotta Co.	xiii.	Manhattan Cement Co.	264	GLAZED AND ENAMELLED BRICK AND TERRA-COTTA.		Celadon Terra-Cotta Company	xii.
Perth Amboy Terra-Cotta Company	xiii.	New York and Rosendale Cement Company	260	American Terra-Cotta and Ceramic Company.	x.	W. H. Gates	iv.
Standard Terra-Cotta Co.	x.	E. Thiele	261	Atwood Faience Co.	xv.	ROOFING TILE CEMENT.	
BOOKS AND PERIODICALS.		Union Akron Cement Co.	261	Fiske, Homes & Co.	ix.	Wm. Connors	263
Architect and Builder	xviii.	CLAYWORKERS' CHEMICALS AND MINERALS.		Meeker & Carter	xiii.	SNOW GUARDS.	
W. T. Comstock	xvii.	F. W. Silkman	261	Pennsylvania Enamelled Brick Co.	xv.	Folsom Patent Snow Guard	xviii.
Brickbuilder Announcements	xvii.	CLAYWORKING MACHINERY.		Raritan Hollow and Porous Brick Company	252	SWINGING HOSE RACK.	
BRICK (Pressed and Ornamental).		Bickel Bros. Construction Co.	xviii.	Somerset & Johnsonburg Mfg. Co.	iii.	J. C. N. Guibert	ii.
Akron Vitrified Pressed Brick Company	xii.	Geo. Carnell	ii.	Tiffany Pressed Brick Company	ii.	TERRA-COTTA.	
Central Press Brick Co.	v.	Chambers Bros. Company	ii.	KILNS.		See Architectural Terra-Cotta, also Fireproofing, also Glazed and Enamelled Brick and Terra-Cotta.	
Day Brick Company	ii.	Chisholm, Boyd & White	xviii.	Bickel Bros. Construction Co.	xviii.	VENTILATORS.	
Donnelly Brick Company	xi.	Freysheckler Company	xviii.	Cutler Manufacturing Company	xvii.	Merchant & Co.	xvii.
Eastern Hydraulic-Press Brick Company	xvi.	McLagon Foundry Company	xix.	MATERIAL ELEVATORS.		WALL TIES.	
Evans & Howard	xiv.	J. W. Penfield & Son	xix.	Contractors' Plant Mfg. Co.	268	J. B. Prescott & Son	xvii.
Excelsior Terra-Cotta Co.	xiii.	Ross-Keller Brick Machine Company	xx.	MORTARS.			
Fiske, Homes & Co.	ix.	Simpson Brick Press Company	270	U. S. Mortar Supply Co.	261		
Fredenburg & Lounsbury	iii.	Sturtevant Mill Co.	264	MORTAR COLORS.			
W. H. Gates	iv.	CONTRACTORS' SUPPLIES.		Cleveland Iron Ore Paint Company	266		
Glens Falls Terra-Cotta and Brick Company	xi.	Contractors' Plant Mfg. Co.	268	Clinton Metallic Paint Company	265		
Hydraulic-Press Brick Companies	xvii.	DRAWING MATERIALS.		Wm. Connors	263		
Anthony Ittner	xvii.	Ball, Ball Company	xvii.	Samuel H. French & Co.	260		
Jarden Brick Company	xvii.	Schwencke, Kirk & Co.	ii.	W. H. Gates	iv.		
LaSalle Pressed Brick Company	ii.						
Lorillard Brick Works Company	xvi.						
H. F. Mayland (Industrial Brick Company)	iii.						
Meeker & Carter	xiii.						
New Britain Terra-Cotta Co.	ix.						
Perth Amboy Terra-Cotta Company	xiii.						
Powhatan Clay Mfg. Co.	iii.						



FAIENCE MEDALLION, LOGGIA OF THE HOSPITAL OF THE INNOCENTS AT FLORENCE.
Executed by Andrea della Robbia.

THE ATWOOD FAIENCE CO.,

HARTFORD, CONN.



MANUFACTURERS OF . .

ARCHITECTURAL FAIENCE,

ENAMELLED BRICK AND HIGH GRADE TILING.

Send for Full Size Detail of Stock Mouldings.

Pennsylvania

Enameled Brick

Formerly Griffen Enameled Brick Co.

Manufacturers of a Superior Quality of

ENAMELED BRICK.

Company.

. . . Quality Equal if not Superior to the best Imported Brick. . . .

Works:
P. O. Address,
Oaks, Pa.

Address all Correspondence
to Main Office,
Jas. L. Rankine, President.

Main Office:
United Charities Building,
4th Ave. and 22d St., N. Y. City.

Officers:

Prest. JAMES L. RANKINE.

Vice-Prest. and Gen. Manager, ARTHUR E. BARNES.

Secy. and Treas. WM. F. BURDEN.

Architects are invited to refer their clients to our

EXHIBITS OF

Buff, Gray, Gold, Pompeian, and Mottled

BRICKS.



PHILADELPHIA:

Builders' Exchange,
18 to 24 South 7th.

NEW YORK:

Metropolitan Building,
23d & Madison Ave.

BROOKLYN:

Builders' Exchange,
276 Washington St.

BOSTON:

Office of Brickbuilder
Publishing Co.,
85 Water Street.

WASHINGTON D. C.:

Washington Hydraulic
Press Brick Co.



Eastern Hydraulic-Press Brick Co.

WORKS:

Winslow Junction, N. J.

• • • •

OFFICE AND SALESROOM:

405, 406 & 407 Builders' Exchange,
PHILADELPHIA.

Send for List of Buildings furnished.

NONE of them turn green.

SALESROOM for New York and New England:

Metropolitan Building,
23d & Madison Ave., NEW YORK.

Address Philadelphia or New York, whichever is nearer.

"LORILLARD" FIRE-PROOF BUILDING MATERIAL, HARD-BURNED CLAY AND POROUS TERRA-COTTA. HOLLOW BLOCKS,

FOR FLAT, ELLIPTICAL, AND SEGMENTAL ARCHES OF EVERY DESCRIPTION.

HOLLOW CLAY CEILING,

FIRE-PROOF COVERING FOR IRON GIRDERS,

HOLLOW BLOCKS FOR PARTITIONS,

FIRE-PROOF COVERING FOR IRON COLUMNS,

HOLLOW BRICK,

COMMON AND PRESSED BUILDING BRICK.

HARD-BURNED AND POROUS FURRING BLOCKS, HARD AND POROUS ROOFING.

SPECIAL SHAPES AND DESIGNS IN ANY OF THE ABOVE MADE TO ORDER AT SHORT NOTICE.

A Large Stock Constantly Carried; Orders Filled Promptly; Shipments by Rail or Water.

LORILLARD BRICK WORKS COMPANY,

CHARLES SIEDLER, Receiver.

92 and 94 Liberty Street, New York.

Boston Office, 11 Doane Street.

Works, Lorillard (Keyport P. O.), N. J.



THE FIDELITY BUILDING, S. W. COR. BROAD AND CHERRY STS., PHILADELPHIA, PA.
The face brick in this building to be special color made to order.

THE
BRICKBUILDER

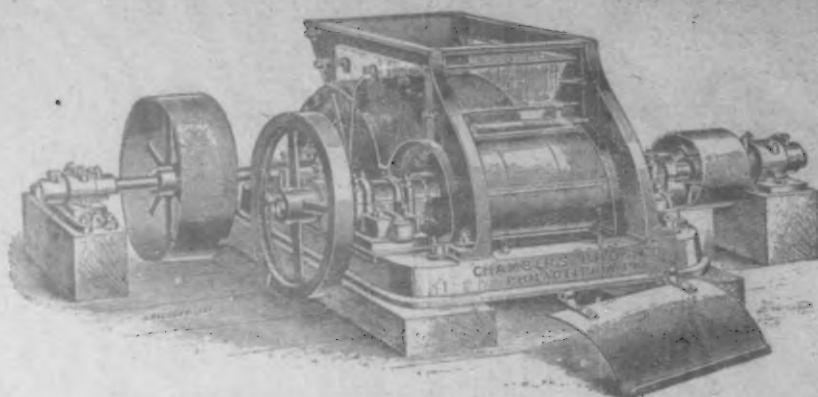


VOLUME
THREE
DECEMBER
MDCCCXCIV
NUMBER
TWELVE

Vp

DEVOTED TO
THE INTERESTS OF
ARCHITECTURE
IN MATERIALS OF CLAY

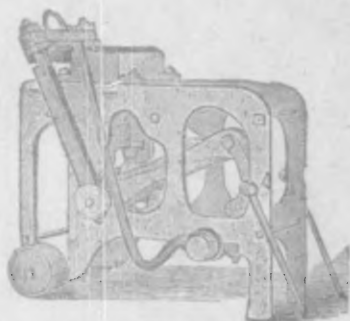
BRICK MACHINES. Heavy Clay-Preparing Machinery.



IMPROVED CLAY DISINTEGRATOR,

MANUFACTURED BY

Chambers Brothers Company Philadelphia, Pa.



RED BRICK PRESS.

GEORGE GARNELL,

No. 1819, 1821 and 1823 German-
town Avenue and Fifth Street,

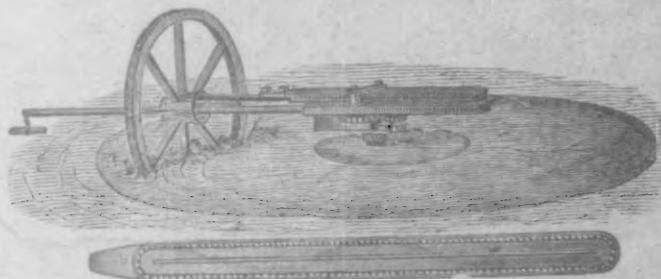
PHILADELPHIA - PENN.

PHILADELPHIA BRICK MACHINE WORKS.

Fire and Red Brick Presses all sizes.

Machinists and Engineers.

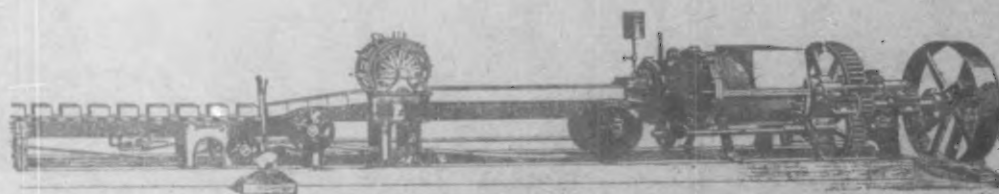
Manufacturer of all kinds of Machinery used in the manufacture of
Fire and Red Brick.



These Tempering Machines can be driven either by Steam or Horse Power. The latest Improve-
ment requires less power to run than the old-style Steam Gearing, and fitted up 10 per cent cheaper.

Send for Circular and Price-List.

Brick, Tile, and Terra-Cotta Machinery.



The Frey, Sheckler Co., Manufacturers,

Bucyrus, Ohio, U. S. A.

TIFFANY

PRESSED BRICK CO.

MANUFACTURERS OF

Pressed and Enameled Brick

PLAIN AND ORNAMENTAL,

403 Chamber of Commerce Building,

Telephone, Main 379.

CHICAGO

Buff Pressed Brick

IN POPULAR SHADES.

Samples forwarded upon
Application.

Brooke Terra-Cotta Company,

LAZEARVILLE, W. Va.

SCHWENCKE, KIRK & Co.,

MANUFACTURERS OF

Direct Black Print Paper "Progress."

WATER-BATH ONLY.

Blue Print Papers, Rubber and Celluloid Triangles,
T Squares, Transits, Levels, Etc.

IMPORTERS OF DRAWING MATERIALS.

26 CHURCH STREET, - - - NEW YORK.



The
"Swinging
Hose Rack,"

PATENTED & MANUFACTURED BY
JNO. C. N. GUIBERT,
Room 108, 39 Cortlandt St.
NEW YORK.
SEND FOR CATALOGUE.

DAY BRICK CO.,

Manufacturers of

Fine Pressed Red Brick.

SAMPLES ON APPLICATION.

WORKS AND OFFICE, BELLEVILLE, ILL.

The LaSalle Pressed Brick Co.,

LaSALLE, ILL.

MANUFACTURERS OF

Red, Buff, Pink
FRONT AND ORNAMENTAL BRICK

Write for Catalogue

